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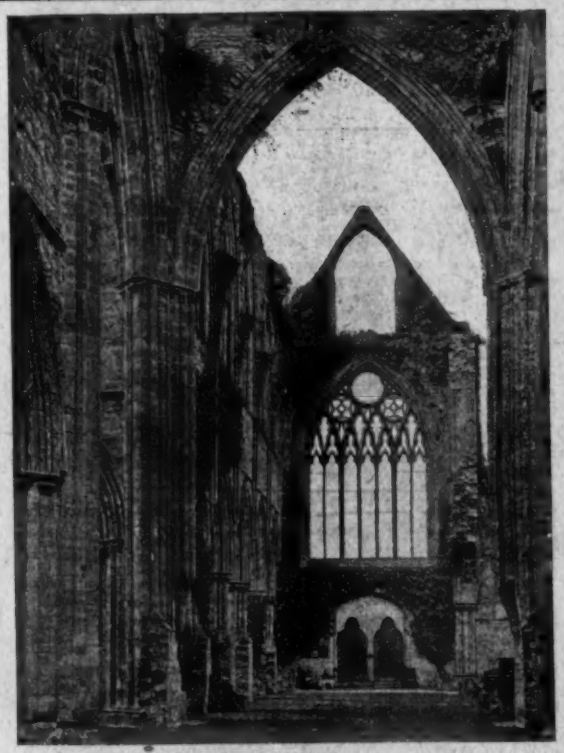

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EDUCATION IN PARLIAMENT:

THE EDUCATION BILL IN COMMITTEE.

NOT many years of watching, from one or other of the quaint little "pews for one" which make up the House of Commons Press gallery, are needed to convince the watcher that there is permanently "something rotten in the state of Denmark" so far as our parliamentary institutions are concerned. The House of Commons is the oldest of its kind; it may be, and probably is, the best of its kind, but certain mental vices of human nature still find too much opportunity there. Ambition, vanity, conceit, loquaciousness, want of balance of mind, "fools rushing in where angels fear to tread," haste, anger, prejudice, lust for popularity—all these, and other hardly less disagreeable traits, are observable nightly from the Press gallery, especially when the topic is one on which generalities may be uttered, platitudes pompously mouthed, and paradoxes proclaimed.

Now "Education" is a topic on which every member of the House of Commons thinks he can speak. It is one of the easy, generalisable, first principles sort of subjects where technical knowledge does not seem essential. And the members who ask themselves usually, not what ought to be done, or even what can be done, but "What can I say?" find a glorious chance in an Education Bill. To watch them spreading themselves upon this pabulum is enough to turn the milk of human kindness sour.

There is the member who says, "I *must* speak, to explain to my constituents (through the long report in the local newspaper) why I am going to vote differently to what they might expect." That is perhaps an excusable motive. But there is also the member who says to himself, "I must speak, because I always do speak." And the member who says, "Here's a chance to say something startling!" and "Here's a precious opportunity for getting my name into all the newspapers." Against these the watcher from the Press gallery hurls silent anathemas, in vain.

Then there are the leading or representative members; the one, two, or three for the Government, who must reconcile, if they can, the principles of the Bill with the exigencies of the division-lobby; the spokesmen for the Opposition, who *must* find reasons for opposing even the most reasonable and proper Bills; the voice of Labour, which must put in a sneer against other voices of Labour; the Irish voice, which must reconcile, if possible, fealty to party with service to an ecclesiastical power. Heigho!

Amidst all these the Education Bill is having a terrible time of it. Amidst all these the Bill seems ceasing to be an Education Bill at all. Very little about education in it, even to begin with, even in cold print; but now, in hot verbiage, how the education in it shrinks and disappears! Welsh National Council, endowments and trust deeds, postponement of Clause 1, deferring of date of operation; on these we heard the members orating, railing, raving for days and nights. Is it any wonder that we are all cynics up in the Press gallery? Is it any wonder that Dickens, after he left that gallery, refused to think of entering Parliament, and felt a contempt for Parliament all the days of his life?

By weary passings through stifling, stuffy lobbies the House, by overwhelming majorities, decided *not* to postpone Clause 1, *not* to divide the Bill into two Bills, and *not* to send non-provided schools back into the wilderness of voluntaryism. Upon this last point occurred a bit of useful work, which typifies the good that, amidst so much palaver and personal friction, the House of Commons does again and again. Sir Henry Craik had made a speech, one of those dismal and doleful utterances which have already earned him in the House the *sobriquet* of "Old Mortality"; an amazing speech for a University member, and one which went far to explain why, during his period of office at the Scottish Department, Scottish Education

seemed to stand still. Having made such a conspicuous success of it with two Scottish Education Bills which came to nothing (or was he only responsible for the first?) Sir Henry must try his hand on the English Bill. He moved that voluntary schools should be able to exist on grants and subscriptions again. He glorified the voluntary principle, and said that it was good to have diversity of types in schools, and good to have an economical voluntary type, to contrast with the extravagance of Board schools. He obtained one supporter—Lord Willoughby de Eresby from Lincolnshire, who supported Sir Henry Craik's proposal because it would relieve his farmers of school rates. Everybody else on his side threw Sir Henry Craik over, more or less politely, and advised him to withdraw his amendment, which stood in the name of other members in later and more suitable parts of the Bill. Dolefully and dismally Sir Henry was preparing to withdraw it, when up sprang Dr. Macnamara and Mr. Yoxall. They objected to the withdrawal. That would permit of the same vicious proposal coming up again. Let the House defeat it and settle it now. The House did so, and all danger of "Voluntaryism" coming about again was conjured away by that useful and timely little bit of watchful work.

Most of the time allotted to the first clause of the Bill was expended upon a matter totally foreign to that clause. Clause 1 affirms that all public elementary schools after a certain date are to be "provided" schools. Upon that members proceeded to try to graft amendments dealing with religious teaching. One of the reflections which causes the observer to contemn the procedure of the House of Commons is that members tumble over each other, so to speak, in their efforts to get in, with the same amendment as others, before others. Thus, a business-like, rational, non-self-advertising member comes to the conclusion that the proper part of the Bill at which to affirm the "secular education only" theory will be Clause 2. But if he puts down his "secular" amendment there he will find it antedated and put out of court by somebody who put down the same amendment to Clause 1. Consequently, quite out of place, the House discussed religious education at full length on Clause 1.

And it was the debate of 1870 over again, except for the experience gained since then, to which the friends of the Cowper-Temple clause and principle could point. The same old protestations that religion essentially lay in dogmas and formularies only—the same old declarations that only in the total absence of religion could you obtain impartial and non-preferential treatment for the sects—the same old assertions that no common basis of Christianity could be found. To all of which the answer came, "Thirty-five years of Board school experience!" "Who can give such instruction without offence?" was demanded. "The teachers!" the answer came, and right through the debate ran the feeling, often expressed, that the whole matter would go right for everybody if only it could be left in the hands of the teachers.

These compliments to the teachers were not so direct and intentional as the teachers might wish. Some members, who seemed to begrudge some of the material benefits which the Act of 1902 has brought to teachers, would not be sorry if they could censure instead of praise. Yet all through the debate, while the Board and Council school teaching of religion was praised, no instance of intolerance on the part of a voluntary school teacher was cited. Indirectly—in a back-handed way, so to speak—the debates were one long testimony to the sense and capacity of the teachers. Everybody agreed that nobody else could teach religion so well to children as can the teachers; and at the back of all there was evidence of a feeling that the Teachers' Union could protect the teachers against unfairness, or charges of unfairness, when carrying out this work.

But that is the best side of this particular discussion; the other sides are less pleasant to contemplate. Mr. Maddison, who moved the "secular" amendment, was strangely fierce against even Cowper-Temple teaching. Mr. Masterman (Mr. E. Gray's successor at West Ham) was just as strongly adverse, if more polished in manner. Mr. Maddison is a Unitarian, it is said; Mr. Masterman would call himself an English Catholic. With other advocates of secularism, too, the idea seemed to be, "If you won't teach *my* religion in full in the schools you ought not to teach any." Against this again and again Mr. Birrell set up the more Christian idea of a common Christianity that all could approve. "But who is to decide that common denominator?" Again the answer came, "The teachers!"

Then Mr. Chamberlain moved "to amend the proposed amendment." Mr. Chamberlain's idea was religious teaching by the paid teachers, but entry of priests, parsons, and ministers during school hours into all the schools of the land, and upon these issues the most extraordinary cross-voting took place. In one division the Liberals, Labour men, Cowper-Temple-ites, and pure Secularists all voted against Mr. Chamberlain's amendment to the amendment, and therefore technically in favour of Mr. Maddison's pure secularist proposal. In the next division, Liberals, some Labour men, all the Irish Catholics, and all the Opposition voted in the same lobby against Mr. Maddison's proposal, and technically in favour of the Bill. In both, the Government won, of course. Mr. Maddison, the protagonist of secular education, scored three more votes than the great Henry Richard did for the same cause in 1870.

The moral is not far to seek; the teachers have made the Cowper-Temple clause a practicable and living thing. The House of Commons recognises that; in short, as in the other matters already referred to, these debates have meant not merely the victory of a Government with cohorts of followers, but of the teachers who have worked so wisely in the schools.

Clause 1, rid of the proposed additions to it which raised "religious" questions—what a misnomer!—came to its trial at last, after endlessly dull speaking by worthy Sir William Anson At half-past one in the morning the division, the final and assertive division on the question "that Clause 1 stand part of the Bill." Majority, 203; and then the Bill was hung up over Whitsuntide.

But what an elaborate sham and solemn farce the debate as a whole had been! How little the members seemed to think of Education, the kernel of the question—how much they cared about what they said, their public appearances in the matter, and the veneer and varnish of the subject! Still, out of all that emerged the principle solidly: there *is* to be a national system of Education; from and after the passing of the Bill all public elementary schools are to be "provided" schools. That is a step onward, a stage in the solution of educational freedom, for teacher and for child as well.

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

N.U.T. NOTES.

THE first meeting of a new Executive almost invariably resolves itself into a trial of endurance, which sometimes tends to produce in the mind of the neophyte a feeling of nausea, if not of disgust. I suppose I shall never *quite* forget how my first day at Russell Square lasted from 10.30 A.M. until after 10 P.M., with a slight luncheon interval, nor how utterly weary I became long before the conclusion of the day's proceedings; and possibly my sensations of a dozen years ago are experienced by every fresh arrival, who returns to his *lares et penates*, thoroughly convinced that a more unsatisfactory method of spending a day than at Bolton House could not possibly be devised. Things are, I confess, not quite so bad to-day as in the early nineties; but they are trying enough, and will, I fear, remain so at the Executive's inaugural meeting, where so much routine business must necessarily be disposed of. The adoption of the Standing Orders has been known to occupy several hours, although probably their very completeness tends ultimately to the saving of time. Exceeding fifty in number, they are a veritable stumbling-block to the beginner, whilst even the "old Parliamentary hands" are occasionally pulled up sharply for their non-observance. Possibly not more than two men are thoroughly *au fait* with the whole set, and one of these is Mr. Marshall Jackman, who, as a chairman, has never been excelled, within my recollection. The selection of the various standing committees and their chief officials was agreed to this year with exceptional readiness and unanimity, and, as a matter of fact, the whole of the names given below were accepted *nem. con.*, with the exception of the Vice-Chairman of the Examinations Board.

Chairmen of Committees.

Standing Committee.	Chairman.	Vice-Chairman.
1. Law	*Mr. F. W. Goldstone.	*Mr. R. N. Lewis.
2. Tenure	*Mr. G. T. Hyden.	*Mr. T. Butland.
3. Finance	*Mr. F. C. Blackburn.	*Mr. J. T. Boulter.
4. Education	Mr. Allen Croft.	Mr. C. W. Hole.
5. Examinations Board	Mr. W. Shawcross, B.A.	Mr. Jas. Harris.
6. Parliamentary . .	*Mr. Marshall Jackman.	*Mr. J. J. Cullum.
7. Organisation . . .	*Mr. G. J. Rankilor.	*Mr. A. S. Caudle.

* Held the same position last year.

It will be seen that ten gentlemen occupied similar positions in the old Executive, whilst promotion has come to the Vice-Chairmen of the Education Committee and the Examinations Board through the election of Mr. Pickles to the Vice-Presidency and the retirement of Mr. T. F. Bowers, B.A. The new Vice-Chairmen are men who have worthily earned the confidence of their colleagues, and who are competent to undertake even higher and more responsible duties. With some diffidence, I make the suggestion to my fellow-chairmen that, next year, it might be an interesting experiment to see how our efficient and capable understudies would acquit themselves at the helm. A self-denying ordinance of this kind would not, in the majority of instances, be attended with any falling-off in the excellence of the work done by the various committees.

NOT being a politician, I do not share the anxiety of certain eminent Union leaders to see the 1906 Education Bill become law, *coûte que coûte*, but I do claim to possess some interest in the future and well-being of my profession. Therefore I was glad of the opportunity to vote for the motion submitted by the Executive to the Scarborough Conference—"That any denominational religious teaching in public elementary schools shall be given by persons other than the teaching staff"—and both to speak and vote against the proposal to rescind this resolution, when introduced by no less influential a gentleman than Dr. Macnamara, M.P. The talented member for North Camberwell lost the day at Scarborough by the narrow margin of three votes, which he must have been chagrined to see increased to seven in the new Executive. No one appreciates more than I the exceptionally brilliant services he has rendered both to education and his former profession during his phenomenally successful public career; nor can I ever forget how in the interminable discussions at St. Stephen's in 1902, he, time after time, let slip golden opportunities for scoring party triumphs and personal *éclat*, in the interests of real education and the teachers in the denominational schools. But I am obliged to confess that, in my humble judgment—and it may not be worth much—he is hopelessly wrong in the attitude he takes up on this vexed question, the right of the denominational teacher to volunteer. If I understand his position aright, he is not concerned with the liberty of conscience of the teacher in the single school areas, but approves whole-heartedly the opening words of Clause 7: "A teacher employed in a public elementary school shall not give any religious instruction of a special character not permitted under Section 14 of the Elementary Education Act, 1870, in any school in which facilities for that instruction are afforded under this Act." His solicitude is apparently reserved for the teachers in those schools where "extended facilities" are afforded under Clause 4 of the Bill; and I can find no apter summing-up of the *effects* of his advocacy than the continued appointment of teachers according to their creedal professions. So long as "freedom from creed tests" is one of the main planks of the Union's professional platform, I hope the Executive will maintain, at all hazards, and at the risk of personal obloquy and potential defeat at the polls, next Easter, the absolutely righteous position they have resolutely taken up. I have never listened to better debating speeches during my lengthened Executive career than those delivered on this particularly vexed question; and possibly the eloquent and sincere oratorical pronouncements of Mr. George Sharples must be awarded the palm, though, from my individual point of view, they were made on the wrong side.

The Executive and "Volunteers."

NO subject that I can call to mind is of greater educational or professional importance than that of Training of Teachers; and at least once a month, the topic appears to be ventilated by assemblies more or less representative. The last week in May witnessed a notable conference (convened by the County Councils' Associa-

A Notable Conference.

tion and the Association of Municipal Corporations), at the Guildhall, Westminster, where the suggested heads of discussion were:—

1. The sufficiency or otherwise of the present supply of Training College accommodation.
2. The best method of supplying any deficiency that may exist; and particularly,
3. Whether such deficiency should be supplied out of national or local funds.

Ladies and gentlemen attended from the London County Council, Residential Training Colleges, Universities, University Colleges with Day Training Colleges attached, National Society, British and Foreign Schools' Association, Wesleyans, Roman Catholics, Association of Directors and Secretaries for Education, Headmasters' Association, Headmistresses' Association, and the N.U.T.; whilst the Board of Education were represented by Dr. Heath, Messrs. P. A. Barnett and Chambers. Sir William Anson, Bart., M.P., presided for about an hour, and when he was compelled to relinquish the chair "for pressing business in the vicinity" (as he put it), Mr. Henry Hobhouse acted as his deputy, most efficiently. There was naturally a variety of opinion expressed by the various speakers, the most prominent of whom were Miss Manley, Sir Henry Hibbert, Principals Wesley Dennis, Reynolds, Hopkinson, Bodington, Symes, Councillor Roberts (Bradford), Canon Brooke, and Mr. Ernest Gray. Generally, the tone of the discussions was favourable to the views advanced by the N.U.T., and Mr. Gray boldly advocated the abolition of the Acting Teachers' Examination, and the modification of the Students' Declaration. In face of the admitted deficiency in Training College accommodation, the policy of the Board of Education in allowing third-class King's Scholars to be deemed eligible for admission was criticised somewhat freely. The defence of Mr. Chambers—that third-class King's Scholars required training as much as any one else—was characteristic of the cynical attitude occasionally assumed by those "in high places." He might have gone a stage further, and added that the *failures* at the Scholarship Examination required training *most of all*. If the Conference does something, if but a little, to make training imperative, and not merely attractive, to those on the threshold of the teaching profession, it will not have been held in vain.

A. C.

NOTES FROM THE NORTH.

I HAVE already referred to the deadlock between the Scottish Churches and the Education Department with reference to the giving of religious instruction under the newly-instituted Provincial Committees. At the recent Assemblies both Churches protested with great eagerness that there was no deadlock. The Churches demand that the Provincial Committees shall provide the religious instruction according to use and wont to the satisfaction of the Churches, for whom facilities of inspection shall be provided. They also contend that the cost of religious instruction shall be met from public sources. The Provincial Committees and the Scottish Office have made it clear that they cannot undertake the provision or defray the cost of religious instruction. All they can do is to afford every reasonable facility in their time-tables and otherwise for the Churches themselves to provide such instruction and satisfy themselves as to its efficiency. It seems that the Training Colleges are not to be handed over so easily as was at first expected. However, now that the various committees are getting to work and their schemes arranged, it would be folly on the part of the Churches not to accept the situation. If they do not agree quickly there is every probability that they will be the losers; for teachers in training will most likely take the path that lies alongside the University, and the result will be that the Training Colleges will have on their hands buildings which in a few years they will have little, if any, need for. The Provincial Committees, if they do not get the present college buildings, will be forced to build for themselves, and the Government will give them assistance. It has been suggested that this is the method the Churches have adopted with a view to getting larger grants. I do not think so.

Scottish Churches and the Education Department.

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IT was expected that the new regulations for the training of teachers would be published immediately Parliament met after the Whitsuntide recess; but as yet I have not seen them. In all likelihood there will be some discussion at the Scottish Estimates on this important question. There are rumours of hostility to some of the proposals. It is to be hoped, however, that the new scheme will not be wrecked or postponed, as it contains in it the idea of a very decided improvement with regard to the teaching profession. Another subject that is likely to be brought well to the front in the discussion is the question of tenure. Great hopes had been raised by the Gartmore case, for in its closing stages it only emphasised the need for some legal form of security of tenure by exhibiting the inability of the Scottish Office to protect a highly efficient public servant from an unreasonable School Board. The question of superannuation is to be kept to the front if possible on that occasion. So far Scotland has not occupied a very large share of the time of the present Parliament.

The Scottish Estimates.

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IN view of the discussion on the Estimates the Superannuation Committee of the Institute has prepared a booklet on the question. In it the working of the Act and its effect upon Scottish teachers are stated with perfect calmness, but convincing clearness. After giving the results of the inquiry made in regard to the superannuation of teachers, the report concludes by saying that the Educational Institute of Scotland believes that public opinion will support its demands for a pension scheme wherein the allowances will bear a reasonable proportion to salaries. This is the case with all other classes of public servants who are compelled to retire at a fixed age, and it is surely not too much to ask the same treatment for teachers, whose work for good or ill so profoundly influences the national life. The Institute is not committed to any particular method of securing this end, but it believes that an equitable scheme of this nature could be established without placing an undue burden on any of the contributories by propor-

Superannuation.

tional contributions from the State, the Local Authorities, and the teachers themselves. The Government and the teachers are contributors already, and the numerous instances in which Local Authorities at present pay the superannuation premiums may be taken as proof of their willingness to become joint contributors also.

THE Institute considers that such a Superannuation Fund should have a first and indefeasible claim upon any further "grant in aid" that may come to Scotland through the operation of the English Education Bill at present before Parliament. If the Scottish members of Parliament, of whom 90 per cent. have already promised to support an amendment of the Act, concentrate upon a demand of this kind, the Institute believes that neither the Treasury nor the Department will be found unsympathetic in view of the proved facts of the case. Meanwhile, pending the placing of the superannuation scheme on a satisfactory basis, the Educational Institute, particularly in the interests of those who have already retired and of those who must soon retire, would respectfully press for one of the following alternatives, or for a combination of both in the case of the smaller areas: (1) The granting to School Boards of the power to supplement the pensions of teachers who accepted the Act; or (2) the supplementing of the present pension out of the unexpended balance of the present "grant in aid." The Superannuation Committee has been fortunate in securing for private circulation the names of teachers who have recently retired, with the amount of pension they have received —a most striking testimony to the parsimonious treatment of teachers under the present Act.

Meanwhile.

AN enthusiastic meeting was recently held in the now historic village of Gartmore for the purpose of celebrating the successful issue of the recent dismissal case. Mr. Menzies has been reinstated, and to mark the happy termination of the protracted and bitter ordeal the ratepayers resolved to present him with a purse of forty sovereigns, and a beautifully-written congratulatory address. The address reads as follows: "Presented, with a purse of sovereigns, to Mr. J. B. Menzies, teacher, Gartmore, in celebration of his twenty-one years of faithful service as village schoolmaster; in appreciation of his many admirable qualities and high Christian character; in condemnation of the unjust and cruel treatment to which he has recently been subjected; with thankfulness at its happy termination, and warmest wishes for his future well-being." Mrs. Menzies was not forgotten in the rejoicing, and received a lovely solid silver tea-service. The meeting was a most harmonious one. Mention may be made of the song—made specially for the occasion by the genial Mr. Alex. Wilson of Alloa, whom many English teachers met recently at Scarborough, the opening words of which were—

Gartmore Head-master.

"There's peace and pleasure in the schule
Since the auld Board gae'd awa'."

(I trust I do not require to translate.)

THE annual business meeting of the Federation Council of this Association was held at the end of May. The Secretary presented the Annual Report, which showed a considerable increase in the membership. In commenting on the failure of the Education Bill, the report urged on teachers the immediate necessity of impressing on Members of Parliament the crying need of doing something to re-organise the educational system of Scotland. A special pamphlet dealing with Superannuation was issued during the session, and the Association had many highly satisfactory interviews on this subject with M.P.'s. It is to be noted that the Class Teachers do not see eye to eye with the Institute with regard to improvement on the present Superannuation Scheme. Their views run more in line with those of the N.U.T.

The Scottish Class Teachers' Association.

It was agreed to postpone consideration of the question of nominating a Class Teacher for the office of President of the Institute. Perth Branch has invited the Association to hold its next Biennial Congress at Perth. This should prove a successful Congress, as the Perth Branch is at present one of the enthusiastics.

Mr. Alexander Mackay, Leith, was elected to the office of President, and Mr. Robert Weir, Glasgow, Vice-President. The other office-bearers were re-elected. After the meeting a presentation of a roll-top desk was made to the indefatigable General Secretary, Mr. Alexander Sivewright, Edinburgh, on the occasion of his marriage.

AT the recent meeting of the General Committee of Management a great amount of important business was transacted. Sanction was given to the *Educational News* Committee to purchase another 250 shares in the paper. This means that the Institute is now practically proprietor of the paper. Might I suggest that the Institute should now put a little more capital into the paper, so that it may be able to launch out in new ways. The Institute has the means, and I trust it will now utilise them. Otherwise there would be no reason for this new policy.

E.I.S. Doings.

A deputation has been sent to London to interview the Members of Parliament with regard to the pressing questions of Parliamentary Legislation, Tenure, and Superannuation. It is to be hoped they will meet with greater success than attended their efforts on the last occasion. It is at such a time that the want of a teacher representative in Parliament is felt by the Institute.

A Sub-Committee is hard at work, I believe, on the question of establishing a Fund for Dependents. Many members of the Institute are pressing for the establishment of such a fund, and though at present the difficulties to be overcome are by no means few, it is to be hoped that the Committee will be prepared with a full report on the subject to present to the General Committee in September.

R. D.

[Since the above paragraphs were written the Scotch Education Department has issued the "Regulations for the Preliminary Education, Training, and Certification of Teachers for various Grades of School," and we shall deal with these next month.]

THE FRENCH ELEMENTARY TEACHER:

SOME THINGS WE CAN TEACH HIM.

BY BENJAMIN DUMVILLE, M.A., L.C.P.

I.

TURN we now to the other side of the medal. This article is not intended for the perusal of the French teacher. It may in passing be said that he has, on several occasions, already heard these plain truths. Neither is it our object to pat the English teacher on the back and to demonstrate the truth of what we said at the outset, namely, that he is at present without a rival. What, then, can be the purpose in indicating those points on which the French teacher is distinctly our inferior? No other than to encourage us to go on and prosper on those lines along which we have already proceeded with some success.

It was mentioned in the first article that corporal punishment is forbidden in French schools. And the means by which discipline is maintained without its aid were described, in order that English teachers might pick up some hints as to the way in which this necessary evil can be reduced to the indispensable minimum.

That there *is* an indispensable minimum the writer is still more firmly convinced after protracted visits to foreign schools. All the valuable means of persuasion and stimulation which have been described avail but little with some children. The thesis that the child is naturally a creature of entirely good instincts is as unsound as the opposite contention that he is all that is bad. The truth lies between these extremes. And, further, it varies greatly in individual cases. Modern psychologists are pretty generally agreed that the new-born babe cannot be said in any sense to have a self—least of all a moral self. Now, this must either make its appearance by degrees or abruptly. The latter alternative is absurd. The first, therefore, is the truth. If we place the full development of this moral self at some period after the elementary school age, it must follow that during the interim it is more or less incomplete.

Many of the "advanced" ideas on the treatment of children presuppose the moral self as fully developed. The truth is—however little we may like it—that the child has something of the brute in his nature.[1] In so far as this is so, we must treat him accordingly; and our methods, while recognising the supreme importance of the gradual elimination of what is brutish, should adapt themselves to the actual condition of the child at the given moment.

The French, as we have already remarked, are fond of insisting on the dignity of the child. The unfortunate part of all this is that the dignity of the *teacher* has to receive very rude shocks. The writer has seen many a good teacher in France reduced to impotence by the conduct of a cunning, bad-dispositioned boy, who is thoroughly conscious of the limits of his master's power, and knows exactly how near to the wind he can sail. It requires a man of quite exceptional force and determination to rise superior to such circumstances as these. In one case, the boy was sent to the head teacher. But the latter was unable, for similar reasons, to do much with him, and confessed that this boy not only made the teacher's life miserable, but had a bad influence on the whole of the class, and, indeed, on the rest of the school. It never occurred to this head teacher—such is the force of the "dignity" hypothesis—that the life which should be made miserable, at any rate until some reformation took place, was that of the *boy*. In another school, the writer was present at an interview between a parent and the head teacher on the subject of one of these obstreperous boys. Conscious of his unassailable dignity, this boy had been leading a life of idleness and indiscipline for some time. His teacher, at length *à bout de forces*, sent him to the head master. The latter talked to him and tried his utmost to get him to see the folly of his ways, and the consequences which would follow in after life. The moral self was apparently at a very rudimentary stage in this case. For on being asked to promise reformation, the boy impudently replied, "I shan't." Here, if anywhere, was the proper place for a sound whipping. But the "dignity" of the child had to be preserved. He was sent home with the request that his father would accompany him to school in the afternoon. The parent came, heard the case, listened to the reasonings of the head master, and replied that under no circumstances would he have his child punished. Nor would he punish the boy himself. He maintained that such was the nature of the lad and such he had a right to be. The head teacher's only remaining means of defence was to exclude the child from school until some sort of promise should be made. But this period could not exceed three days. Any longer time would require the sanction of the head inspector of the district. So great is the fear of the elector in democratic France, that few would dare to interfere with the liberty of the parent. And it is possible that this boy would at any rate be admitted to another school, where his late triumph would render him still more arrogant and impertinent.

In France, the true bearings of the question of

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[1] The error of many well-intentioned people who write and talk about the treatment of the young is the common psychological mistake of projecting one's own nature into the children.

Bain, in his well-known work, *Education as a Science*, agrees in the main with what is said here. The following quotations are of interest:—

"The worst form of malignant feeling is cold and deliberate delight in cruelty; all too frequent, especially in the young." (Page 73.)

"In the play of children, there is the same employment of the forms of destructive malevolence" (as in the "play" of puppies and kittens, to which he has been referring—page 75).

"The play of canine and feline kind often degenerates in this fashion; and in childish and youthful amusements it is a perpetual rock ahead." (Page 76.)

On the whole question of corporal punishment, while adopting the "correct" attitude, Bain makes sufficient admissions to justify the line of argument here taken:—

"With all these various resources ingeniously plied—emulation, praise, censure, forms of disgrace, confinement, impositions—the necessity for corporal punishment should be *nearly* done away with." . . . "Where corporal punishment is kept up, it should be at the far end of the list of penalties." (Page 116.)

"The schoolmaster's most wayward subjects come often from good families; and they are found in schools of the highest grade. There should be no difficulty in sending away from superior schools all such as could not be disciplined without the degradation of flogging." (Page 117. But this means of dealing with the evil spirits has not been adopted. When allowed, as they are, to remain with the other children, the necessity of energetically repressing insubordination is all the more necessary on account of the danger of contamination.)

corporal punishment are seldom understood. The reasons of this are the hypocrisy of the teachers, the optimism of inspectors, and the general ignorance of the real state of affairs displayed by those philanthropic persons who interest themselves in education.

First, of the hypocrisy of teachers. Even among themselves, teachers are disinclined to speak of their difficulties. It is only natural that the teacher, with his eye on promotion, should not care to admit his weaknesses. He fancies that since his colleagues do not speak of difficulties, they have none; and decides that the correct thing is to hide his fancied inferiority. One is reminded of an oriental tale. In a certain city it was announced that a spectacle would be seen passing through the streets at a given hour. But it would be of such a character that only truly honest and innocent persons would have the faculty of seeing it. Crowds of people turned out at the prescribed time, and all were extravagantly demonstrative in their admiration. But a little boy had the temerity to cry out: "Papa, I don't see anything at all." Another little child followed suit. An older person was shamed into confessing the truth. Others joined in. And finally all confessed that they saw nothing whatever! It is much the same with teachers. Confession of weakness will be regarded as professional incapacity. Further, the fear of those in authority causes many to admit all that is dictated to them. When they are told that they ought to do without any corporal punishment, they suppose either that they are greatly lacking in control or that their conditions are special ones; or, lastly, they are so dominated by the personality of their masters (and it may be affirmed that personality goes much further than correct reasoning) that they are "bluffed" into admitting what in their calmer moments they know to be impossible.

The writer, in all his experience, knows of only one case where a teacher admitted candidly to an inspector the necessity of resort to "illegal" methods. It was on the occasion of a number of lessons being given before an inspector in a certain elementary school. In an adjoining room was a large class of turbulent east-enders who, for the honour of the school and for the peace of all concerned, had to be kept extremely quiet. At the conclusion of the lessons, the inspector came through the room and complimented the teacher on his power of control, asking how he managed to secure such discipline. The teacher replied that there was no mysterious secret in the matter. He had, he said, begun with persuasion, had continued by minor punishment, and had finally maintained peace by picturing the most terrible things which would certainly happen to the luckless boys who made any noise. It should, however, be added, in conclusion, that the teacher in question was not a true primary wage-earner, but a young university man picking up a little experience in order to strengthen his claims to an inspectorship. He could, of course, afford to be honest.

Next, of the optimism of inspectors. Even in the case of the few who have had some experience in actual teaching, we find extravagant ideas of what moral suasion and personal magnetism can do. When the teacher becomes inspector, a complete change of point of view takes place. What was hard becomes easy. His late difficulties become trifles. And, as in the case of our old friend Falstaff, his achievements when a teacher grow more and more marvellous as time passes. Although *he* sometimes found it necessary to resort to rough measures, he either forgets this or considers that he might have avoided them. A new experience comes to strengthen these views. Wherever he goes, he finds good order prevailing. He often forgets that he is now inspector, and that the magic name causes a complete transformation scene whenever he enters a room. He will tell you that all his good teachers manage to do without any corporal punishment. He little knows that not many yards off, probably at the moment he is speaking, a poor jaded teacher, perhaps one of the very examples he has in his mind, at the end of his tether, loses all count of regulations and restrictions, and permits himself to strike an impertinent young rascal who has been goading him on to desperation during several weeks.

And now a few words on the ignorance of philanthropic enthusiasts. These people are open to all the errors of the inspector—and for similar reasons. But they have many others. Their comparative ignorance of the true conditions of the teacher's work leads them to imagine that all should go on in the same way as during their pleasant little talks on the occasion of their visits. Perhaps the class of people which provides the greatest proportion of these enthusiasts consists of the ministers of religion. Many of them are keen supporters of undiluted moral suasion. Now in Geneva there is no religious instruction by the teachers, and the ministers of the different sects who wish to propagate their doctrines are allowed to go into the schools and to gather their little flocks into various class-rooms for lessons in Holy Scripture. It is true that the conditions of this instruction are rather difficult. For these lessons are given at the end of the ordinary school work. But there are also compensating circumstances. These religious teachers can choose their own methods, are not responsible to any inspectors or examiners, and offer numerous prizes to the diligent and attentive. In spite of this, they find great difficulty in keeping any semblance of order. One of them, more candid than the rest, admitted that when he went before his class he felt like a *dompteur de bêtes fauves*. If it were proposed in Geneva to allow a judicious amount of corporal punishment, these men, rendered sympathetic by their own experience, which is not only past *but still continues*, would probably be the last to set up opposition.

To come nearer home. If moral suasion backed up by an elaborate system of rewards could suffice, how is it that most of our Sunday-schools are so disorderly? Yet here we have conditions far more favourable in many respects than those of the day school. The hours are short, the lessons are made as interesting as possible, often at the sacrifice of higher ends, the classes are exceedingly small, and the school meets only on one day a week. Some, perhaps, will deny the inferiority. For instance, a young superintendent, at his wits' end to restore order in the bedlam which was rendering the Sunday afternoon address inaudible, shouted above the din: "Don't think you are in the Board school!" Of course, a good deal of this failure may be put down to the incapacity of many Sunday-school teachers. To this it may be replied that the exceedingly favourable circumstances should counterbalance this weakness. It may, however, be maintained by some that the discipline of the ordinary Sunday-school is satisfactory. All that can be answered is that it would not be sufficiently good to insure the

application necessary for the mastery of the ordinary school subjects.[1]

The discipline of the French elementary school may be said to resemble in some respects that of our Sunday-schools. What is considered only fair with us would be excellent there, and what is passable in France would be unsatisfactory in England. The consequence is that with longer hours of instruction and regular home lessons, the average French boy does not reach so high a standard of proficiency as his English cousin. On the occasion of the New Year, the pupils in French schools compose a letter of greeting and good resolutions to their parents. This is carefully supervised by the teacher. In the school which the writer visited at this time of the year—an ordinary school, neither very good nor very bad—he examined a large number of these letters in various classes. *Not a single one was free from common faults in grammar and orthography.* Let it be granted that perhaps other educational objects are better subserved in France. The writer is of opinion, for instance, that the love of reading and some elementary taste in literature are developed to a higher standard than with us; also, that the best pupils go further than our own, and that secondary education in France reaches a higher level than in England. But he contends that these results are due to other causes, and might very well exist, and even be improved, with a better system of general discipline. The literary superiority of French schools results from the general emphasis laid on these subjects. It is no part of good discipline to destroy these effects. The superiority of secondary education in France—at any rate from the point of view of instruction—is rather due to the fact that the French are a more studious people than the English, that the national traditions favour literary pursuits, and that a boy who displays any degree of excellency is pushed on by his ambitious parents and teachers, and by a highly organised system of scholarships.

But there are further effects of the total prohibition of corporal punishment which are still more harmful. Other forms of punishment have to be called upon to a much greater extent than with us. Their weaker restraining power brings it about that they have to be multiplied excessively to make up for the stronger forms. If we may be permitted to represent the case mathematically, it may be said that a punishment which inspires half the amount of dislike[2] which a given standard imparts, requires, in order to produce anything approaching the same effect, to be multiplied, not by two, but by four. In some schools which the writer has visited, the arrangements for detention and the writing of exercises are of a most elaborate kind. In one, the head teacher has a special system of book-keeping. Each boy has his account, and the master makes daily rounds to collect the impositions which have been written and to balance up his book. What an ogre he must appear to the boys!

If it be further noted that each assistant teacher has his own formidable list of punishments, some idea can be formed of the excessive amount of line-writing which exists in many schools. The writer spent a whole day in the highest class of the school last mentioned. During this time the master inflicted the writing of tenses of verbs on at least a third of his class. Yet he is by no means a weak teacher. He is probably the best in the school. But, in order to get really good attention and ready obedience from the whole of the class, he is compelled constantly to distribute these little tasks. When he gives a pupil a bad mark it is inscribed against his name by a chosen scholar who keeps a record. Three bad marks require two tenses to be written. Anything less than three is ignored. At the beginning of the day, the teacher's voice was heard from time to time exclaiming: "Bad mark to X." Later this grew insufficient, and one heard, "*Two* bad marks to Y." Later still the rallying cry was "Two *tenses* to Z." And finally it was not uncommon to hear *ten* tenses inflicted in one breath. This occurred on a Saturday; so that the boys would have to write most of these *on Sunday*, when they should be enjoying rest and relaxation.

Now, French boys already spend too much time in school and at their home lessons. Keeping in, therefore, whether at school or at home, is little short of a crime in their case. To give a bad boy a stripe or two with the cane "on that part of his body which nature seems to have provided for the purpose," and to let him go and recover in the open air, is better for him than further detention in the schoolroom.

In spite of the judicious employment of minor punishments, much of the teacher's effort is rendered futile. It is a piteous sight to see good teaching thrown away on indifferent and listless pupils. Yet the writer has no hesitation in saying that in many French schools quite a half of the good seed falls on barren ground. The general slackness of the boys cripples the teacher, who seldom expects the attention of all his class, and seems quite satisfied if he is listened to by a half or thereabouts. Indeed, it is comparatively rare to see a class in which every pupil is giving attention. This must not be ascribed to the inability of French teachers to give interesting lessons. Probably they are superior in this respect to their English *confrères*. The secret of the failure is that many children will not give attention unless they know full well they *must*. If that first effort of voluntary attention could only be obtained, the teacher and his lesson would get a chance to seize on the involuntary attention of the pupils. But failing the initial effort on the part of the pupil, nothing except the highly sensational, which cannot of course be continually employed, has any chance of producing an effective result.

Perhaps the most serious effects of the prohibition of corporal punishment are certain immoral ones. The teacher in many cases is led to affirm complete abstinence from it, although he frequently resorts to irregular forms. One teacher whom the writer questioned asserted categorically that he never employed it in any shape or form. A few moments afterwards he approached a pupil to correct a mistake, when the latter threw himself into the characteristic attitude of self-defence. A certain head master, apparently more candid, admitted that sometimes when he had a bad boy in his private room, he would give him a little "shaking up," but added significantly, "*sans témoins*." Now, the pupils are well aware that corporal punishment of any kind whatever is forbidden.

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[1] The writer has no desire to depreciate the good work which is done in Sunday-schools. They are only mentioned here because they furnish an excellent illustration of the standard of discipline which is to be expected from moral suasion alone.

[2] Of course, no exact measurement is possible. But, as in the case of Bentham's calculus, the general principle may hold, though its application is difficult.

The teacher who employs it surreptitiously is bound, therefore, to lose some of their respect.

Another important consideration is the danger of causing injury to boys with blows delivered at random by a teacher who has no proper instrument. In England it is universally admitted that, if corporal punishment is to be administered at all, it should be undertaken when the teacher is calm and able to exercise all due precautions. With this view, the French opinion, as expressed to the writer by several teachers, forms a curious contrast. They can understand a teacher losing his temper with an unruly boy and striking him in the heat of the moment; but they seem unable to comprehend that a man should resolve on the punishment of a bad boy, and should wait until he is perfectly calm so that it can be undertaken with caution.

One obvious answer to the whole of this argument is that some teachers *do* succeed in maintaining good discipline without the rod. This we frankly admit. But the circumstances are usually of a very favourable kind. For instance, the teacher may be a man of quite exceptional power, or the boys a more than usually good set. But our legislation must not be for the few excellent cases. Because a few men can walk the tight-rope, it would not be expedient to prescribe the exercise as obligatory for all. We must frame our regulations to meet average conditions. Most town schools have a small section of badly bred boys who are a disturbing element for the whole class, if not kept under firm control. One bad boy will do more to wreck the discipline of a class than half-a-dozen good ones can do to maintain it. Indeed, it may be said that even the well-disposed boys take a secret pleasure in the "successes" scored by the unruly. Insubordination is alarmingly catching. The influence of the better section in the direction of law and order comes into play with any appreciable force only when the bad are held in check. In the poor districts of industrial towns, the neglected children present exceptional difficulties, and often require a very strong hand. By all means let authority be kind; but let it first assert itself as authority. That being done, punishment can be reduced to a very small quantity. It is certainly better for boys to feel the harsh hand of the law at school than to postpone their acquaintance until the gaol entraps them. *Qui aime bien châtie bien.*

Some have remarked that of late years there has been a decline in respect for law and authority in France. The French crowd disobeys bye-laws because they are bye-laws. May not this be a consequence of the greater licence which is permitted to the schoolboy, who learns early in life that he can make himself a nuisance with impunity?

It must not be concluded that the writer is an upholder of the martinet discipline of the "good old times." The present argument is rather for the possibility of this form of punishment than for its frequency. Its permissibility should in most cases render its actuality unnecessary. Further, those other forms of punishment which, although milder, are probably more aggravating and harmful, would be greatly reduced in number. For the boys, knowing the extent of the master's power, would respond to his commands with so much more alacrity that these minor chastisements could be largely dispensed with.

Before closing this somewhat lengthy discussion the writer would like to observe that he may be considered capable of taking an impartial view, seeing that he has not been in circumstances where corporal punishment is possible for the last eight years. No one more than himself longs for a time when the children of the masses shall be sufficiently well trained at home to render this rough method of treatment practically unnecessary. But all the enthusiastic philanthropy of the present time has failed to persuade one who, though he has no occasion to exercise this form of punishment, is firmly convinced that, *under existing conditions*, it is sometimes necessary as a last resource. The "awful example" of France is there to teach us.

SPECIAL REPORT ON SCHOOL TRAINING FOR THE HOME DUTIES OF WOMEN.

THE Board of Education have issued a second volume on this subject, showing what is being done on the Continent to forward the teaching of Domestic Science. The necessity of some form of instruction in this subject is recognised in every country of western Europe, although the particular bent of the teaching varies with the political and economic conditions of the various nations; thus in Sweden, which is one of the most aristocratic countries in Europe, the "secondary" aspect of the case has been most clearly realised, whilst in Belgium a more utilitarian attitude has been adopted. The report on the latter country occupies about half the book, and should prove of special value to the educational authorities of great industrial centres, where the pressure of economic and social conditions rapidly destroys all interest in domestic duties among girls and women who have to work in factories and places of business. For this reason we shall deal with this report first, treating it somewhat more fully than those on the other countries.

In 1889 the Belgian Government awoke to the fact that the exigencies of the organisation of modern labour had completely changed the domestic conditions of the people. The facts of the case were most strikingly set out in a Circular addressed to the Governors of the different provinces: "The girl goes out early in the morning to the coal mines, to the works, to the factory; she often stays there all day, and only returns home in the evening. She has, therefore, no opportunity of adapting herself to household duties, and not only is the opportunity wanting, but there is no inclination. Having worked as industriously and as long as her father and her brothers, she believes herself justified in resting as they do. It is, doubtless, but rarely that the thought of a preparation for future duties enters her mind. She thus arrives at the marriage period almost a stranger to all the necessities, as to all the responsibilities, of her new social condition." Then follows a vivid picture of the moral and economic disorder of a home established under these unfavourable conditions. The Circular urged that regular instruction in the principles of domestic economy and hygiene should be given, with practical demonstrations, to all classes, and that a special class (*classe ménagère*), in which the older girls could learn practical household work for two afternoons a week, should be attached to the upper standard of every primary school. The

Circular further outlined the organisation of a proposed *classe ménagère* for adults. Both these suggestions have been since carried out, and instruction in domestic science has been introduced into secondary schools; it forms a most important feature in the curriculum of the Technical Institutions for Girls which have been established in many places, and in some cases these institutions confine the instruction entirely to housewifery.

I. Primary Schools.—The original Circular laid it down that household work should include—

1. Needlework, principally knitting, sewing, cutting out, and making ordinary garments; mending.
2. Household occupations properly so called, such as various ways of cleaning, washing, and ironing linen, cooking, etc.

The instruction in needlework aims chiefly at practical results; thus, for instance, great attention is paid to the making and mending of ordinary garments, and such other work as is adapted to the conditions under which presumably children will have to live.

Needlework is taught to the whole class simultaneously, with individual correction; the different stitches are first demonstrated on canvas upon a frame, with a big needle and thick coloured thread, the learning of each stitch being followed by practical applications, at first simple and then more advanced. In the upper standards measurements are taken by one pupil from another before the class; the pattern is drawn and cut out in paper, and afterwards in the material; then comes the necessary tacking together, fitting, correcting, and making up. Other lessons are also brought to bear on the subject: thus, in arithmetic for instance, the pupils calculate beforehand the cost of the stuff and materials necessary for the work, while drawing in girls' schools is taught with especial reference to needlework. The specimen syllabus issued by the Ministry allows three hours a week for needlework in the lower standards, and four in the upper.

In teaching Domestic Economy special attention is paid to what is useful and practical, the aim of the instruction being "that the daughters of working men should learn to use the resources at their disposal to the best advantage, to have intelligence and taste for household occupations as well as practical skill, and, generally speaking, to be happy in the actual conditions of their lives."

The following is the Government model syllabus:—

Lower Standard.

Very simple talks on the following subjects:—

1. Garments of a little girl; order and preservation.
2. Some furniture for kitchen, dining-room, bedroom; necessary care of it.
3. Some food substances; how to serve them at table.
4. Charcoal and wood for burning; precautions to take when the fire is lighted.
5. Candle and lamp; dangers to avoid.
6. Some garden plants for decorating the house; use to make of them.

Middle Standard.

Inductive and practical talks on the following subjects:—

1. Washing linen and clothes.
2. Cleaning table-service and furniture; sweeping the kitchen and rooms of the house; dusting.
3. Qualities and preservation of meat, fish, eggs, milk, butter, bread; picking and cooking vegetables.
4. How to prepare a fire; precautions to take in lighting it.
5. Cleaning and use of a lamp.
6. Weeding and watering garden plants; preservation of fruit; arrangement of bouquets of flowers.
7. How to lay the table, to serve, and to clear away.

Upper Standard.

Inductive and practical talks, sometimes accompanied or followed by reading or composition exercises, on the following subjects:—

1. Washing and ironing small articles of lingerie and of dress; taking out stains, and keeping garments in repair.
2. Cleaning and care of kitchen utensils and of the principal furniture of a house; cleaning kitchen and rooms.
3. Choice and preservation of the principal food substances, and of milk, coffee, and beer.
4. Use of ordinary combustibles; lighting a fire; care of a stove.
5. Choice, care, and use of a lamp.
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2. *Patching garments;* mending linen; darning.

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6. *Fancy work.*—Embroidery on cloth.

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a. Hygiene lessons; treating first aid in cases of slight accident; the symptoms of children's illnesses; the proper means of preserving health; the care of children, of the sick, and the old; the preparation of some herb teas; the knowledge, use, and healing properties of some remedies which form a small domestic medicine-chest; the care of a sick room, etc.

b. Principles of domestic economy.

c. Some principles of domestic accounts.

d. Methods of washing and ironing.

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f. The nutritive value of certain foods, the properties of certain vegetables, and principles of cookery.

2. As practical work—

a. The care of a house, its different parts, and the furniture; care of bedrooms, parquets, floors, tiles, etc.; the household work to be done each day, each week, each season.

b. Washing linen, garments, stockings, etc.; how to remove stains of ink, tar, paint, fruit, etc., as well as the precautions to take before, during, and after washing; washing flannels, woollen materials, etc.; bleaching—the precautions to take respectively with freshly mown grass, the fall of leaves, of buds, and of soot.

c. Ironing—recommendations on the subject of the table, the irons, and the fire; folding and gauffering linen, etc.

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e. Needlework; mending and care of all kinds of clothing and of linen; various kinds of darning, and patching stockings. Special attention should be given to the utilisation of old garments. Lessons should also

Circular further outlined the organisation of a proposed *classe ménagère* for adults. Both these suggestions have been since carried out, and instruction in domestic science has been introduced into secondary schools; it forms a most important feature in the curriculum of the Technical Institutions for Girls which have been established in many places, and in some cases these institutions confine the instruction entirely to housewifery.

I. Primary Schools.—The original Circular laid it down that household work should include—

1. Needlework, principally knitting, sewing, cutting out, and making ordinary garments; mending.
2. Household occupations properly so called, such as various ways of cleaning, washing, and ironing linen, cooking, etc.

The instruction in needlework aims chiefly at practical results; thus, for instance, great attention is paid to the making and mending of ordinary garments, and such other work as is adapted to the conditions under which presumably children will have to live.

Needlework is taught to the whole class simultaneously, with individual correction; the different stitches are first demonstrated on canvas upon a frame, with a big needle and thick coloured thread, the learning of each stitch being followed by practical applications, at first simple and then more advanced. In the upper standards measurements are taken by one pupil from another before the class; the pattern is drawn and cut out in paper, and afterwards in the material; then comes the necessary tacking together, fitting, correcting, and making up. Other lessons are also brought to bear on the subject: thus, in arithmetic for instance, the pupils calculate beforehand the cost of the stuff and materials necessary for the work, while drawing in girls' schools is taught with especial reference to needlework. The specimen syllabus issued by the Ministry allows three hours a week for needlework in the lower standards, and four in the upper.

In teaching Domestic Economy special attention is paid to what is useful and practical, the aim of the instruction being "that the daughters of working men should learn to use the resources at their disposal to the best advantage, to have intelligence and taste for household occupations as well as practical skill, and, generally speaking, to be happy in the actual conditions of their lives."

The following is the Government model syllabus:—

Lower Standard.

Very simple talks on the following subjects:—

1. Garments of a little girl; order and preservation.
2. Some furniture for kitchen, dining-room, bedroom; necessary care of it.
3. Some food substances; how to serve them at table.
4. Charcoal and wood for burning; precautions to take when the fire is lighted.
5. Candle and lamp; dangers to avoid.
6. Some garden plants for decorating the house; use to make of them.

Middle Standard.

Inductive and practical talks on the following subjects:—

1. Washing linen and clothes.
2. Cleaning table-service and furniture; sweeping the kitchen and rooms of the house; dusting.
3. Qualities and preservation of meat, fish, eggs, milk, butter, bread; picking and cooking vegetables.
4. How to prepare a fire; precautions to take in lighting it.
5. Cleaning and use of a lamp.
6. Weeding and watering garden plants; preservation of fruit; arrangement of bouquets of flowers.
7. How to lay the table, to serve, and to clear away.

Upper Standard.

Inductive and practical talks, sometimes accompanied or followed by reading or composition exercises, on the following subjects:—

1. Washing and ironing small articles of lingerie and of dress; taking out stains, and keeping garments in repair.
2. Cleaning and care of kitchen utensils and of the principal furniture of a house; cleaning kitchen and rooms.
3. Choice and preservation of the principal food substances, and of milk, coffee, and beer.
4. Use of ordinary combustibles; lighting a fire; care of a stove.
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be given on purchasing, ordinary cutting out, and the making of bed linen and women's garments. It is advisable to have the cost price of each article calculated.

f. Finally, for rural communes, kitchen gardening and attending to the poultry yard."

There are no definite demonstration lessons, the girls from the first being given practical work to do, beginning with simple occupations preceded by theoretic instruction. Each pupil must attend at least two practical lessons of two hours and a half to three hours per week.

The ruling principle in the equipment of these schools is that the pupils should not use any utensils or apparatus that are not within the means of the working classes; the total cost of equipment seldom exceeds £20. As a rule the school is held in an ordinary dwelling-house, but in some cases special premises have been provided. The number of rooms depends on the size of the school, but there is always at least one large room, which serves as kitchen and dining-room, often as ironing-room and mending-room as well; and there is a separate wash-house, which as a rule opens straight into the yard. The floors of kitchens and class-rooms are sometimes wood (when they are sprinkled with sand), but more commonly they are stone; the walls are washed down in white or colour, but in a few cases they are tiled. All the rooms are made as bright and attractive as possible, with plants on the window sills, neatly arranged cupboards, small ornaments on the mantelpiece, and so forth. For cooking and ironing the girls always wear white aprons and sleeves, but in the wash-house they wear sabots and large overalls. Very strict supervision is exercised by the Government to ensure that these schools should keep to their proper function of training women to do the work of their own homes, and not to fit them for going into service. "Invariably, when I notice that the teachers have a tendency to push their pupils in this direction," says M. Rombaut, "I threaten to have the school closed, to withdraw all grants; and, if the case should occur, I keep my word." In spite of the slow progress made at first in the establishment of these schools, when once their usefulness was recognised by the people a change set in, the number increasing from four or five, with which the movement started, to over two hundred in six years.

In conclusion, we would give the following quotation from M. Rombaut, who is virtually responsible for the origin and development of the special housewifery schools, for in it is embodied the aim and ideal of the domestic education of girls in Belgium:—

"Vous savez que dans ces dernières écoles (écoles ménagères) nous avons le ferme désir de former de braves filles qui tiendront, lorsqu'elles se marieront, leur petit ménage avec ordre, propriété, et économie. Je caresse une idée, et je mets tout en œuvre pour la réaliser; c'est de former dans nos écoles industrielles et professionnelles des hommes instruits, aptes, réfléchis, rangés, artisans de la prospérité générale, et d'autre part, d'obtenir, par l'enseignement pratique que nous donnons dans nos écoles ménagères, des femmes économes, prévoyantes, éclairées, et renseignées sur leur mission familiale, pouvant par le mariage assurer le bonheur du foyer et servir d'exemple aux autres travailleurs. Ce n'est peut-être qu'un beau rêve mais j'espère cependant qu'il se réalisera bientôt."

A HIGHLAND TECHNICAL SCHOOL.

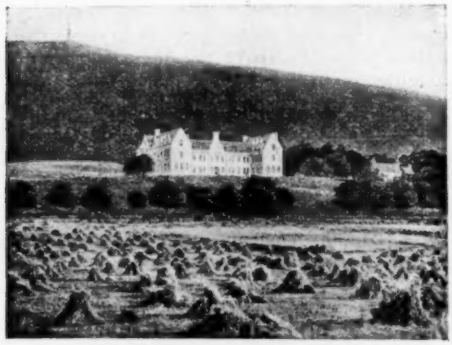
PIONEER WORK BY THE DUCHESS OF SUTHERLAND.

"THERE are parishes in the Highlands," an inspector of schools has said, "in which it is a misfortune to be born," because of the small chance there is of a youth who is reared in any of them, however richly endowed intellectually, ever getting a chance of that higher education which is so necessary nowadays for those who wish to excel; nothing beyond the "supplementary courses," if he be fortunate enough

HER GRACE THE DUCHESS OF SUTHERLAND,
Founder, and Chairman of the Governors.

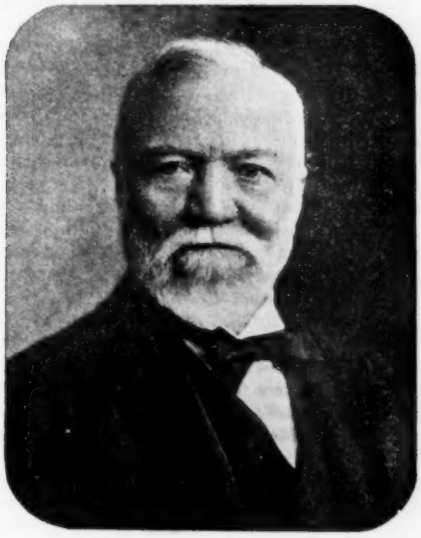
to have even a year or two in them before leaving school, as he nearly always does soon after reaching his fourteenth birthday. Of course, there have always been excellent schools dotted all over the north, and for generations the schoolmasters got pupils to win bursaries which set them on their way to be clerks, lawyers, teachers, doctors, and ministers; while the others were, apart from the advantages which a good humanitarian education gave, left to shift for themselves, and somehow not many of them saw the wisdom of becoming skilled masons, carpenters, sailors, etc. It was because the Duchess of Sutherland saw that for such the old days of "a shilling in your pocket, and luck go with you, my boy" were past, and that Highland lads need the full equipment of education if they are to hold their own in the neck to neck race of to-day, that she conceived the idea of a technical school, which she hopes is only the first of several such institutions in the north to teach Highland boys in their own northern land to mentally master their surroundings, to use their own hands for the production of things of beauty and usefulness, and, above all, to call out their reserve force and self-reliance, and so help to remove the anxiety which comes to all who have given "the Highland problem" any serious thought. The aims of this pioneer school, as stated by the founders, are to take a lad straight from the primary school at about the

age of thirteen, and give him a three years' course of training under circumstances which should at the end of that time have so marked out his special capacity and so strengthened his faculties and physique that if sufficient funds are found for him, or found by himself, almost any career of practical usefulness may be open



SUTHERLAND TECHNICAL SCHOOL,
From the South.

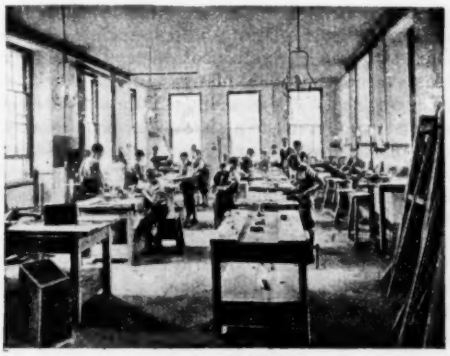
to him at home or at a distance. On leaving school, it is above all things desired by the founders that his capacity and ambition should keep each lad from joining that great army of unskilled labour which, year by year, sweeps into the towns to sink or swim. It has, indeed, been long recognised that to stop this tremendous over-supply of unskilled labour there is a crying



MR. ANDREW CARNEGIE,
Who provided half the Building Fund.

need in the north as in all country districts for a practical education with a scientific bias, though that ought never to be disjoined from an intelligent interest in literature.

Though in foreign countries such schools are established by the State, yet here it is left to the individual to take the initiative, and it is safe to say that there are very few in the kingdom who could have done this so effectively as the Duchess of Sutherland, who collected for the "Sutherland Technical School" a total sum of £16,000, exclusive of the splendid site and grounds given by her husband, who gave in addition a gift of £8000. Dr. Andrew Carnegie gave £5000 to



CRAFTS ROOM.

the building fund, and Lord Strathcona gave £1000 for the equipment. The place, as now completed, is well worth a visit, and the governors extend a welcome to all educationists. It is situated near the village of Golspie, and within two miles of Dunrobin Castle. Externally it has an imposing appearance, with its three stories of white freestone standing on a piece of ground which rises abruptly from the stretch of level, fertile fields lying between it and the Moray Firth. Over the main entrance are carved the Sutherland arms and Carnegie's motto, "Let there be light." On going inside, one cannot help being struck by the spaciousness and brightness of the rooms, and considering that only about forty lads are here, one cannot help exclaiming "lucky fellows," as there are something

MASTERS AND BOYS.
First Session, 1904–5. Twelve boys from Sutherland; six boys from Caithness; six boys from Ross-shire.

like fifty-six rooms, all devised with a view to their comfort and safety. There are fourteen classrooms, workshops, laboratories, museums, etc. The dormitories are fifty feet long by twenty-one broad, and contain only twenty single beds apiece, each with its Sutherland tartan coverlet.

Though it has been found that £20 per pupil is

sufficient for the annual upkeep of similar science schools in England, her Grace made the more liberal estimate of £30 each for Highland lads, and already there are forty such bursaries guaranteed by such donors as the Duke and Duchess of Sutherland, the Duke of Westminster, the Duke of Portland, Mrs. Carnegie, Mr. James Coats, Paisley, etc. The pupils are drawn from the crofter, cottar, and fishing classes in Caithness, Sutherland, and Ross-shire, and so desirable is a place in this school deemed that there are at least three times as many suitable applicants as there are places. It is managed by a local board of governors, who have the assistance of an advisory committee, on which are such men as Lord Reay; Mr. Haldane, M.P.; Professor Meldola of the London Technical College; five inspectors of schools; Professor M. Maclean, Glasgow; Professor Wallace, Edinburgh; Professor Baillie, Aberdeen, etc.

The progress of the school will continue to be watched with interest by all educationists, and if one may judge by the cheerful alertness of the lads, and the good fellowship which already very evidently exists between them and their teachers, much good may be looked for.

HISTORY IN MAKING.

THE GEORGIAN EXHIBITION.

"TO say that the past is of no importance, unworthy of a moment's regard, because it has gone by, and is no longer anything, is an argument that cannot be held to any purpose. The past has received the stamp of truth, and left an image of itself behind." So writes Hazlitt in that curious essay "On the Past and Future," in which he lays stress upon the superiority of what *has been* to what *may be*. It is the historian's standpoint. All the ways of time are littered with fragments eloquent of the travellers who have passed along the road and over the brow of the hill, out of sight and hearing. The historian, trudging patiently along the same road, with the same inevitable end in thought, turns aside curiously to examine those often slight things that tell so much about the character and habits of those who have left them without thought of their pregnant meaning.

So the "unconsidered trifles" that an historical Autolycus snaps up, have far more than a commercial value. They bring pleasure and profit at the same time; unlike Bardolph's stolen lute-case, which he carried three leagues, and sold for three-halfpence, bearing in the meantime the intolerable nuisance of its company.

It would be hard if the tide of Time had not left these pretty pebbles along the beach as it receded. As it is, they have retained something of the brightness they showed when in the waves; and, gathered together, these scattered stones enhance each other's beauty and interest.

This inherent love of the past accounts for our museums. It accounts also for the loving care that places these "baubles of time" in close neighbourhood, so that Grecian sculptures may receive light from Grecian vases, Egyptian mythology from temple frescoes, and Roman law from the settled order and strength displayed in a Roman column. So seen, they mark with inevitable truth the minds of their creators. From first to last, the Greek shows his refinement and love of beauty; the Egyptian his broad humanity, based upon, and yet enwrapped with, a mysticism that peopled their strange mental world with abstractions which they pictured in their weird assembly of gods; and the Roman his magnificent sense of power and dominion.

And not only nations show these characteristics, but, among themselves, subtle differences gradually grow out from age to age, almost from one year to another. No nation (except perhaps the Chinese) remains fixed in thought and habit, and one of the great delights of history is to read, in literature and in art alike, the gradually evolving mind of the people. Goethe asserted that ten years in any man's life are sufficient to account for the most startling change in his opinion and outlook. Books and pictures, buildings and dress, the minutest interests of man, are eloquent of such changes. Already early Victorian is seen to differ widely from late Victorian in every particular. The national strain remains the same, but small waves form and break on the backs of great movements of the sea; as the tiny drippings from an oar send circles spreading over broad waves without largely disturbing their flow, so the restless daily occurrences have their own trend and meaning which do not largely affect the deep-seated national movements.

The eighteenth century in England is full of these "accidentals," interesting from every point of view. For the historian will regard them according to his temperament. It was a happy thought of some one to gather together at the Whitechapel Gallery a collection of things from the eighteenth century that had survived the hunger of Time, the "devourer of all things." And what a light these slight things throw upon written history, and how they set the mind off on various tracks! Here is a sheet of the *Bath Chronicle* for 1798. The glories of Bath, Tunbridge Wells, and Cheltenham spring to sight at the very title of the newspaper. A crowd of people famous in all branches of human endeavour, politicians, writers, artists, actors, have left their records of Bath and its strange life revolving round the Pump Room. The very advertisements are eloquent. What was this famous "Lady Molyneux's Italian Paste" which is announced with such gusto? for not "the most severe frost can crack the skin of those who use it." Ah! those powder-rooms, those elaborate toilettes of the beauties whose grace was toasted by the bucks of the day; do the fashionable ones still, in the shades, look with complacent pride upon that prince of masters of ceremonies, the egregious Beau Nash?

Then there is that resonant announcement of a book "for the use of schools," duly heralded in pomp (how it rolls round the author's tongue!) as containing "Moral and Entertaining Dialogues in English and French for the Improvement of Youth"—one suspects it a sugar-coated pill for learning a foreign language, sententiously. We pass by the advertisement of the "Four Nag-Tailed Bay Coach Horses to be sold, together with a fashionable CHARIOT," just picturing in the mind's eye the agreeable rattles who made the journey in dashing style from London. There is nothing more living than an old newspaper.

But here we pass to quite other things. The eighteenth century has been called Infidel by persons who forget Dr. Johnson and the Divines. But echoes of the great revival murmur about us, as we see, in earthenware, the busts of John Wesley and George

Whitefield. Never were such revivalists—maltreated, looked upon with horror by the Establishment, yet rousing a movement that has left a deep-bitten effect in the national life. It became an age of religion side by side with wild debauch. Look at these tea-cups each with its pious verse. For our great-grandparents were continually minded of moral truths—

> "The loss of gold is great,
> The loss of Time is more;
> The loss of Christ is such a loss
> As no man can restore."

And we think of the little girls working on their canvases in daintily-coloured silks, and in such tender years showing their neatness and piety on samplers that were proudly hung in the parlours where the quiet family passed its quiet life. What sweet child was Rebekah Bland, whose tender fingers, in the year of grace 1749, worked this pretty sampler—alphabets, a verse, and, below, a landscape set in fancy with trees and a windmill never seen but in a child's fairyland, where all things are brightly coloured?

> "No happiness is here compleate,
> 'Tis hard to be both good and great;
> In riches no assurance is,
> And pleasure yields uncertain bliss."

How, like the little Quakeress who put a tuck in her dress, does the tender moralist imply that she has found all the pleasures of the world but dust and ashes?

But the world was not altogether idyllic. Visions of warfare, of grave national stress, come with these prints of the battles of the Nile and Trafalgar, and of George III. reviewing the 10th Regiment. Be sure the demure little workers of samplers clapped their hands with glee after every famous victory—for the world is all of a piece.

Pictures, indeed, are more eloquent than books when people and places are in question. In the company of these prints of Georgian streets, with their simple straight elevations in red brick, their windows outlined in white, we are back again with Goldsmith, and with Dr. Johnson superstitiously touching every post along his walk down Fleet Street. And here, in another, is the Fleet River itself. The mind travels about this quarter sacred to authorship; it peers down these side entrances leading to Gough Square, Red Lion Court, Wine Office Court, and sees a merry company, assembled in inns and coffee-houses; while not too far off to lose its minatory power, is the Fleet Prison itself, not unknown to the impecunious poet.

It was the heyday of English portraiture, to which we owe such vivid impression of the notable people of the age. Sir Joshua Reynolds, Gainsborough, Romney, Hoppner, Zoffany, and a host of lesser lights lead us, with their peaceful portraits, into the very company of the Court and polite society. Here is the thin, sharp-featured, somewhat short-faced Great Commoner, William Pitt, cheek by jowl with the free-living, spendthrift Man of the People, Charles James Fox, whose republican tendency is not obscurely hinted at in Gillray's caricatures. With a volume of Walpole's caustic letters in hand as a commentary, it is pleasant to idle away an hour in such notable company. On the one hand we look into the eyes of the man whose eloquence—more than Danton's—"shook the roof" and compelled admiration from a cynical world, the man with clean hands in an age when bribery was the rule, so that Walpole could dare to say that "every man had his price;" on the other hand stands the politician and gay gambler, turning from a heated debate in the House to *rouge-et-noir*, and losing thousands of pounds in a sitting with the utmost *sang-froid*.

And what memories crowd as we look at the speaking likenesses of Clive and Warren Hastings with all the issues of an Indian empire in the making. The calm-eyed Dean Swift, the punctilious, clerical-looking Sterne, recalling the "sea-green" Robespierre in general lineaments, are as little like our imaginings as Horace Walpole with the face of a city clerk. Their portraits in mezzotint bring the living men home to us; they are no longer vague voices speaking from the land of dreams, but real flesh and blood fashioned like ourselves. Thus portraiture brings men into their true place. Nothing beats old portraits in peopling again a vanished world. Humanity is seen to be very human after all.

History is often too much inclined to pass contemptuously all but the Court and the Parliament. But the pulpit and the stage are not negligible quantities in estimating the tendencies and acts of an age; nor, for the matter of that, can it be said truthfully that *any* act, fashion, or outward expression is without its deeper meaning. Did not Carlyle build a whole philosophy on Clothes?

These pictures of the streets, the churches, the exchanges, and the mansions reveal, unmistakably, the new semi-classical taste in things, which is evident in a thousand particulars. Here, in a glass case, is a book with the pleasing title *The Lucubrations of Isaac Bickerstaff, Esq.*—"lucubrations" is good—while the fair owner of another, *Diana* Frances Gorges, shows that her parents had fallen in with the prevailing taste in christening their children Horatio, Achilles, Proserpina—a taste which the high-born countered by falling back on plain George, Betty, and Polly. Why, even this jug with its two figures, a boy offering a bird's nest to a girl, bears a label on the trunk pinned there by some love-sick swain, and bearing the praises of "Hebe."

The stage was a potent factor. The new taste found delight in *Cato*, and this, by easy stages, brought back the classical plays of Shakespeare to favour—Shakespeare, omitted by Addison from his list of English poets! What players were these! Here are portraits of Garrick, Sheridan, Foote, Mrs. Siddons—The Tragic Muse—Mrs. Abingdon (most coquettish of actresses, and most trying for her waywardness to distracted stage managers), Peg Woffington, charming in comedy. For the reaction to simplicity gave birth to those delightful English plays, *She Stoops to Conquer; The Rivals; The School for Scandal*, and many another.

Neither was the opera omitted, for music had gone to its native land, and Handel was a power in the land. Even the accompanying dances of opera found its advocates. Here is the portrait of the Fair Auretti pirouetting with the grace of a pair of compasses, though the artist makes amends by his charming verse written beneath:—

> "The fair Auretti, free from blame,
> Received of Heaven and of Men,
> The Soul of Balls and of the Dance,
> The gift of Flying in Ballance."

The exhibition contained quite a unique collection of china (Bow, Chelsea, Wedgwood) as well as of dress, furniture, and even toys.

FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than July 8th, 1906**, and addressed:—PRIZE EDITOR, Office of the *Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Il faudrait demeurer à l'âge en fleur. On organise sa vie comme si on devait toujours avoir vingt-cinq ans. On a plus sincèrement l'attitude qu'on croyait favorable à son bonheur. On s'y est fixé. Mais tant d'années viennent neiger sur votre beau vouloir! A la fin, ne paraîtra-t-il pas glacé et piteux? Jadis une femme a fait, sans convoitise, des gestes d'ambition; c'était encore des gestes d'amour, puisqu'elle visait à la gloire, à la félicité caressante de l'homme aimé. Son élan avait de la grâce, elle était jeune. . . . Elle ne l'est plus, ou elle l'est moins. Parce qu'elle aspire, en certaines heures, à l'immobilité, faut-il la taxer de fainéantise? Ou n'est-ce pas plûtot qu'une pudeur l'arrête, consciente que ses mouvements s'alourdissent et qu'elle grimacerait demain? N'est-ce pas qu'elle pressent une sorte de contradiction, un hiatus entre la maturité prochaine et les souhaits de sa jeunesse qui était hardie et charmante? Le même effort qui est sagesse chez les jeunes, et prévoyance, deviendra puéril s'il est poursuivi indéfiniment. Une vieillesse ambitieuse serait une absurdité; quand la comédie touche à sa fin, se dérange-t-on pour gagner quelques rangs? On n'est lâche, on n'est lasse, on ne voudrait le repos pour soi et pour les siens qu'à cause qu'on n'a plus l'âge de la vivacité. La dame-errante enverrait son chevalier à toutes les croisades. Elle a l'avenir, elle croit que c'est l'éternité.

From "L'Associée," by LUCIEN MUHLFELD.

RESULT OF THE JUNE COMPETITION.

The prize is awarded to "Quis." (Will "Quis" kindly forward name and address for publication?)

First Class. — Lemuel Gulliver, Traductio, Ray, Aquina, Nolle, Semper fidelis, Edith, Penarth, Fishdom, A Practical Teacher, Eicarg, Gawayn, Tinkie, Strawberry, Espérance, Mergy, Carpe diem, Dim, Doodah, Through, Débutante, Rennes, Missette, Alf, Mona, Grimbarian, Consuetudo, Chero, Lothian, Smut, T. V. D., Duclair, Bobby, Lytton, Togo, Cockayne, Bluebell, Dunnottar, She, Agaznog, Shakspere, Marie Dolores, Koran, Esperantist, L. I. T., Guy, Stonefield, Rita, Monq, Winnowsty, Raema, Joli-cœur, In a hurry.

Second Class.—Saxonne, M. A. G., Hazelwood, North, D. M. B., Jemima, Shrew, Polyglot, Jaki, Max, Bella, Aimée, Enna, Namron, La jeune fille, Ernest, Beauty, Balinard, Mount Ephraim, Odd no, Kelp-ware, Meersbrook, Caerfpyddin, Espérance (B), Pierre Goureau, Madeleine.

The name and address of "Thirlestane," the winner of last month's competition, are:—Mr. J. H. Fraser, Castle Mills, Fountainbridge, Edinburgh.

Report.

The quality of the exercises is well maintained. Only two passages overcame a large number of competitors. *Craindre . . . que l'autorité civile . . . ne l'emportât* was one of them. The *ne* is not translated in English. French and Latin idiom require *ne* after verbs of *fearing*. *Il a vécu enfant*, etc., was the second. This was translated as "He was treated as a child," etc. It simply means "He passed his childhood," etc. A few candidates made errors which showed they were not conversant with the history of the period.

Prize Translation.

About the middle of one of these nights, when the moon was lighting up her room, she (Marie Antoinette) looked at it, and said to me that within a month she should see that moon, herself freed from all her bonds, and the King a free man. Then she confided to me that all was well in train for their deliverance; but that the opinions of their most trusted advisers were conflicting to a degree,—some guaranteeing complete success, while others pointed out insuperable difficulties. She added that she was informed of the route to be taken by the princes and the King of Prussia; that on such a day they would be at Verdun, on such a day in another place; that the siege of Lille was about to begin; but that M. de J——, whose sagacity and sources of information both the King and herself put much faith in, was very doubtful as to the success of the siege, and made them afraid, even though the commanding officer were faithful to them, lest the civil authority, which by the constitution gave great power to the mayors of the towns, should overbear the military. She was also very anxious about what would happen at Paris during this interval; and spoke to me of the scant energy shown by the King, though always in words which testified respect for his qualities, and affection for his person. "The King," she said, "is no coward; he has very great passive courage, but he is overcome by false shame and lack of self-confidence, which comes rather from his education than his disposition. He is afraid to take the lead, and dreads inexpressibly addressing an assembly. He was brought up somewhat childishly and nervously under the eye of Louis XV. until he was twenty-one; and this restraint has increased his natural timidity. In circumstances like ours, a few well-chosen words to the Parisians who are faithful to him would increase our party's strength a hundredfold; but they will not be spoken by him. What can we hope for from the placards which he has been advised to address to the people? Nothing but fresh outrages. I, for my part, could act, and mount horse too, if necessary; but such a move would only furnish weapons to the King's enemies; outcries against the Austrian woman, against petticoat government, would arise all over France; besides, in bestirring myself, I should be weakening the King. A queen, if she be not regent, in circumstances like these can only wait patiently and prepare for death."—*Mémoires de Madame Campan.* QUIS.

OUR HOLIDAY SECTION

PRACTICAL TRIPS FOR PRACTICAL TEACHERS.

HOLIDAY TRAVEL NOTES.

ANOTHER educational year has slipped away with all its worries and anxieties, all its toils and troubles, and in a short time the books will be packed away, the schoolroom door closed, and our readers will, for a few brief weeks, enjoy a well-earned rest, as only those can

> "Who, with a fervent heart, go forth
> Under the bright and glorious sky, and look
> On duties well performed, and days well spent."

But a teacher must not lose sight of the fact that a holiday is not only the reward for days well spent, it must also be a period for recuperation, for relaxing the highly-strung nerves, for restoring the energy that is well-nigh spent, and for getting the body generally fit and well to withstand the arduous strain that the conscientious performance of scholastic work entails. This is a point that is persistently overlooked by those individuals who delight in rushing into print during the silly season, and who occasionally include school holidays among the various things in heaven and earth that they are so anxious to reform. This it is, and not the fact that he has, as a rule, a little longer time at his disposal, that causes the teacher to give more earnest thought to the method of spending his holidays than the average business man does; he looks upon it as a trust, as something to be used not entirely for his own pleasure, but in a way that will benefit his work by sending him back to school bubbling with energy and imbued with new ideas.

For this reason we have never hesitated in devoting a part of the July number of the *Practical Teacher* to hints and suggestions for the holidays, and to a few more detailed accounts of holiday trips which appear to be extremely enjoyable and somewhat original. These trips have in every case been taken by the writers themselves, so that the information is perfectly reliable, and our experience in past years has proved to us that those of our readers who plan their holidays on the lines of any of our Practical Holidays will not be disappointed.

OLD VILLAGE, SHANKLIN, I.W.
(From Messrs. Ward, Lock and Co.'s Guide Books.)

Many of our readers, however, "have given hostages to fortune," and must keep their holidays to more stereotyped lines, such as a visit to the sea-side, or a few weeks at a farm-house. Although we are unable to offer them much practical assistance, we hasten to extend to them our heartiest good wishes for a pleasant holiday, both for themselves and little ones, and to remind them that their travelling days are by no means ended, for in a few years' time they will be overhauling the bicycle or furbishing up the ice-axe in order to take these same youngsters over the beauties of the old familiar routes, or possibly to explore together "fresh woods and pastures new."

We should like to point out the facilities that are

now offered by most of the railway companies for family holidays of this kind; a post-card to the head office will bring an illustrated list of farm-house and sea-side lodgings, together with particulars for the despatch of luggage in advance; and by giving three days' notice of the particular train by which the journey is to be made, either single seats or a whole carriage, if the numbers warrant it, will be reserved.

Those of our readers who wish to utilise the holidays by making a practical study of modern languages would find the holiday courses arranged by the Teachers' Guild of Great Britain and Ireland particularly useful; the courses last for three weeks, that for French being held at Tours and Honfleur, German at Neuwied on the Rhine, and Spanish at Santander; syllabuses of lectures, etc., may be obtained from the Secretary, 74 Gower Street, London, W.C.

Another holiday course that has been much appreciated by many of our readers in former years is that held by Professor Bascan at Villerville, a delightful little watering-place near Trouville, which forms a convenient centre for exploring Normandy.

The tourist and traveller at this season of the year will thank us for drawing special attention to the "*Queen*" *Newspaper Book of Travel*. This volume is a veritable cyclopædia of information, illustrated by 16 maps and 45 illustrations, and contains upwards of 400 pages. Each town or resort is indexed alphabetically under the country to which it belongs, so that the information needed is available in a moment. Every possible detail as to the place, its climate, sport, excursions, pensions, hotels, etc., can be seen at a glance. The United Kingdom and the countries of Continental Europe are treated in the fullest possible way, and the indexed paragraphs are replete with practical hints of the greatest value. There are also numerous specially written articles, *e.g.* "Alpine Plant Life," "The Swiss and English Rivieras," "Swedish Sanatoriums," "Continental Schools," "Hints on Continental Travel," "Motoring on the Continent," and much tabular information as to the routes and fares from London, foreign currencies, weights and measures, etc. In addition, colonial countries are also dealt with. There is also a number of modest and extended model tours abroad which are invaluable. The work is no mere compilation. There is evidence that every note and statement has been gathered with care, and subjected to the strictest revision. Such a work as this has never before appeared in this country, and in view of the richness of its travel and geographical information, a copy should be possessed by every teacher in the land. It is published by Horace Cox, *Queen* Office, Bream's Buildings, Chancery Lane, and the price is 2s. 6d.

"Bell's Cathedral Series." A new volume just issued, illustrating *Southwark Cathedral*, reminds us that at this time of the year we have on several occasions drawn attention to the volumes of this admirable series. There are now between forty and fifty books in the list, and these not only deal with our cathedrals at home, but with prominent continental cathedrals and churches. Each book is prepared with much taste, the letterpress by a competent authority, and the illustrations are works of art. Such companion hand-books are not only of priceless value when on tour, but either before or after travel are most valuable as works of reference. Very few teachers take their holidays without visiting a cathedral in one city or another, therefore we heartily commend these handy volumes to the notice of our readers. They are issued in cloth covers at 1s. 6d. (British) and 2s. 6d. (Continental) by the well-known publishing firm, Messrs. George Bell and Sons, of Lincoln's Inn, London, W.C.

Messrs. Marlborough and Co. have also recently issued in their popular "Self-Taught Series" a revised and enlarged edition of *Italian Self-Taught*, with aids to pronunciation and serviceable vocabularies for tourists' use. In addition to a good selection of phrases and sentences, there is an elementary grammar. Cycling and motoring terms are included in the Travel Talk section, as well as photographic terms and phrases. French, German, and Spanish books are arranged on the same plan, and any of these books to non-linguistic tourists will prove helpful, and perhaps stimulate interest in the language wrestled with.

Messrs. Houlston and Sons have issued a very cheap (4d.) and useful series of District Handy Maps from the Ordnance Survey. They are on the scale of four miles to an inch, and very clearly printed and coloured. To the pedestrian, cyclist, or motorist they should prove of the greatest value. When folded they will easily slip into the waistcoat pocket. There are no less than sixty maps in the series, particulars of which can be obtained upon application to any bookseller, or to 7 Paternoster Buildings, E.C.

The railway companies at this season set out the attractions of the districts they run to in the form of attractive handbooks. The London and South-Western Holiday Trips include not only the south-west of our own island, with its many charms, but also the delightful districts of Normandy and Brittany. From personal experience we can strongly recommend the trip to St. Malo, from which centre there is a considerable choice of itinerary, each tour being full of interesting old-world buildings, and among people whose ways are well worth studying.

Our cyclist friends must not be forgotten. Theirs is a mode of enjoyment that has a charm and a freedom of its own. Although the writer of these lines is at present laid up as the result of a cycling accident, he does not feel his enthusiasm abated one iota, and recommends the sport to others most heartily; at the same time he does advise them to have good maps—maps which show not only distances and directions, but, what is still more important, the slope of the road and the nature of its surface. No cyclist should set out on a tour, or even for a spin into fresh country, without taking one of Gall and Inglis' Contour Road Books. They are extremely handy, and supply the cyclist with the facts it is most essential for him to know.

Two great mistakes are made by those who spend their holidays in English resorts. One is to say that there is nothing particular to see where we are going, and the other to say that if there is we shall be sure to see it, or that the natives will point it out to us. Now the ordinary native of a provincial town is an extremely unreliable guide, and no one should go on his holiday without taking a little book describing the objects of interest in the place he is about to visit. Messrs. Ward, Lock and Co.'s Illustrated Shilling Guides have acquired a wide reputation. Those on England and Wales comprise about seventy books, each one dealing with a centre and the country surrounding it. The information given is most reliable, and great pains

seem to be taken to bring the matter up to date, while the illustrations, especially in the newer editions, are simply splendid. In uniform series are guides to various parts of Scotland, Ireland, and the Continent.

CIRCULAR TICKETS.

IN these days, when there is so much discussion on the question of municipal and State trading, it is interesting to compare railways owned by the State with those owned by companies. Certainly, if the Belgian State Railways can be taken as an illustration of the former, they are quite up to the others in general management, and a long way ahead in their endeavour to afford facilities to the travelling public. Travellers for Belgium, Germany, and Central Europe will find not only a great convenience, but a considerable reduction in price, by sending the outline of their route to the office of the Belgian State Railways in Gracechurch Street, E.C., and having a through ticket made up for the whole journey. In another way the Belgian and Swiss railways confer a great favour on the public which is almost unknown in England, because only procurable at enormous cost—in the issue of passes, available for either a fortnight or a month, over the whole railway system. Thus a visitor to Belgium can fix on one or two centres, and work freely from each of them in exploring the surrounding country, travelling as far as he likes and as often as he likes along each line. In fact, for the few shillings he has to pay he can practically live in the train.

The following itinerary shows the ground actually covered by a party of teachers and friends during their Swiss trip last year:—

From Basle to Zurich (which being a capital railway centre was made the headquarters for a week); steamboat excursions on the lake; Zurich to Schaffhausen and back; Zurich to Arth-Goldau, and after ascent of the Rigi, return by steamer from Vitznaut to Lucerne and by train to Zurich; Zurich to Fluelen, return by steamer and train; Zurich through the St. Gotthard Tunnel and *viâ* Bellinzona to Locarno at the northern end of Lake Maggiore, then after a few days on the Italian Lakes, from Chiasso—about five miles from Como—back through Lugano and the St. Gotthard Tunnel to Lucerne, thence over the Brunig to Meiringen, and on to Berne, including steamboats on Lakes Brienz and Thun; Berne to Lausanne, and Lausanne up the valley of the Rhone to Visp. Here they surrendered the tickets and received their deposits, as they had arranged to stay at Zermatt. In the fourteen days they travelled about 700 miles at a cost of 28s each.

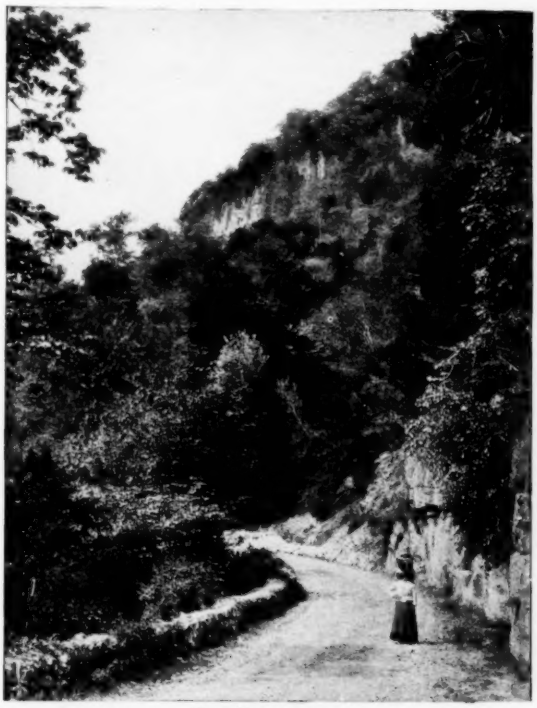
Nature Study will doubtless make great claims on the holidays of many who have adopted the cult. We have received particulars of a Holiday Course which will be given at the South-Eastern Agricultural College, Wye, Frome.

This course is intended primarily for masters in secondary schools in rural districts, but the excellent programme of theoretical and practical work that has been drawn up will prove very attractive to others as well. Of the thoroughness of the teaching in this college, our readers can see a sample in the splendid notes that have appeared for some time past in the *Practical Teacher* from the pen of Dr. Russell, one of the lecturers in the college.

THE VALLEY OF THE WYE.

"How oft, in spirit, have I turned to thee,
O sylvan Wye! Thou wanderer through the woods,
How often has my spirit turned to thee!"

YOU ask me, Mr. Editor, to give you a description of the river Wye, and its attractions as a holiday resort; but, alas! the charm of that valley defies all attempts at description, and unfortunately the term holiday resort has practically lost its true and original meaning. To those whose ideas of a holiday consist of niggers and bathing-machines, or of ringing the changes



THE WYNDCLIFF.
(From Messrs. Ward, Lock and Co.'s Guide Books.)

on the wardrobe in order to compete in the display of fashion on the promenade or pier, the Wye Valley will present no attractions. But to one who has learned to look on Nature and to love her, and who feels his soul uplifted by the contemplation of her beauty, who can point out a lovelier district than the valley of the Wye?

The scenery of this valley is so impressive that the appearance of many spots remains indelibly fixed upon the memory. So striking is the scene that meets the eye as the road passes Symond's Yat and the Wyndcliff, that one could draw the landscape from memory long after.

One has only to spend a few days in this delightful district to feel that his whole nature has been improved by the stay. He will realise the influence that such scenery had on Wordsworth, and how through that influence on Wordsworth and his friends the whole course of English poetry was changed. He thus de-

scribes his feelings on revisiting the banks of the Wye:—

"And now, with gleams of half-extinguished thought,
With many recognitions dim and faint,
And somewhat of a sad perplexity,
The picture of the mind revives again:
While here I stand, not only with the sense
Of present pleasure, but with the pleasing thoughts
That in this moment there is life and food
For future years. And so I dare to hope,
Though changed no doubt from what I was when first
I came among these hills; when like a roe
I bounded o'er the mountains, by the sides
Of the deep rivers, and the lonely streams,
Wherever nature led; more like a man
Flying from something that he dreads than one
Who sought the thing he loved. For nature then
(The coarser pleasures of my boyish days,
And their glad animal moments all gone by)
To me was all in all.—I cannot paint
What then I was. The sounding cataract
Haunted me like a passion; the tall rock,
The mountain, and the deep and gloomy wood,
Their colours and their forms, were then to me
An appetite: a feeling and a love
That had no need of a remoter charm,
By thought supplied, or any interest
Unborrowed from the eye."

And just as a century ago a change came over the spirit of our poetry, and the formal verse of the seven-

THE FERRY, BROCKWEIR.

(From Messrs. Ward, Lock and Co.'s Guide Books.)

teenth century was replaced by the inspired lines of the Lake Poets, so now, in the training of the young, nature-study is displacing some of the more formal studies in the curriculum. But let us take care that it is living Nature that we put before our pupils, not badly painted pictures of "still life," but Nature herself, infused with her resplendent brightness and infinite variety.

When I first visited this lovely region I was on a cycling trip with my wife, and after visiting Shakespeare's country and Worcester, we climbed over the Malvern Hills. The day was dull, and the combination of fog and mist stretched away in its immensity, reminding us forcibly of the old poet, William Langland, a native of this part. In his *Vision of Piers Plowman* he speaks of "Serjeants that served atte barre," and who "plededen for penyes and poundes the lawe," and such was their greed that—

"Thou mightest better mete the myste on Malverne Hulles,
Than gete a momme of here mouthe, but money were showed."

Although the weather continued showery for some time, it cleared up by the time we reached Hereford. This delightful city offers much for the student of history and antiquities. It was during Saxon times the capital of Mercia, and figured in the wars with the Welsh as well as in the Danish invasion.

The Cathedral is a splendid building, and is a history of architecture in itself. There are fine examples of Norman work in the choir, through the round arch at the end of which one sees the Early English work in the Lady Chapel beyond. The main portions belong to the Decorated style, from 1288 to 1367, but some of the smaller portions, such as the chantries and cloisters, belong to the Perpendicular, while the western façade is quite modern. One of the most beautiful features within the building is the chancel screen designed by Sir Gilbert Scott. So much is there of interest in Hereford that the visitor should if possible spend a few days there, and from the city as a centre visit the interesting places in the environs, especially Kilpeck Church and Castle, while Kington, Weobley, and Belmont well repay the time spent in going out to them. Leominster is another interesting place, which should not be missed if time can possibly be found for the excursion.

We left Hereford and passed through Lower Bullingham, keeping to the right bank of the river, past the beautiful grounds of Holme House, the seat of the Earl of Chesterfield. The fourth Earl was well known as a patron of literature, and his celebrated *Letters to his Son* are regarded as a prose classic. Alexander Pope was a visitor at Holme House, and there wrote his third *Moral Essay*, in which he writes professedly "Of the Use of Riches," but the poem is simply an attack on his enemies. The poem opens with the well-known line—

"Who shall decide, when Doctors disagree?"

and by way of contrast to the harm done by some people with their money, Pope praises up a local philanthropist—Mr. John Kyrle—whose name is practically lost through his being spoken of as "The Man of Ross"—

"But all our praises why should Lords engross?
Rise, honest Muse! and sing the Man of Ross:
Pleased Vaga[1] echoes through her winding bounds,
And rapid Severn hoarse applause resounds.
. . . . . .
Whose Causeway parts the vale with shady rows?
Whose Seats the weary Traveller repose?
Who taught that heav'n-directed spire to rise?
'The Man of Ross,' each lisping babe replies.

[1] *i.e.* the river Wye.

Behold the market-place with poor o'erspread!
The Man of Ross divides the weekly bread;
He feeds yon Alms-house, neat, but void of state,
Where Age and Want sit smiling at the gate;
Him portion'd maids, apprenticed orphans blest,
The young who labour, and the old who rest.
Is any sick? the Man of Ross relieves,
Prescribes, attends, the medicine makes, and gives."

The traveller comes across so many references to the Man of Ross in this neighbourhood that we have ventured to give these few lines to show what manner of man he was. His tomb can be seen in the parish church of Ross, and the modesty which led to the omission of his name on the original stone is thus beautifully described by Pope:—

"And what? no monument, inscription, stone?
His race, his form, his name almost unknown?
Who builds a church to God, and not to Fame,
Will never mark the marble with his name."

The road keeps fairly close to the river, and runs through lovely country down to Ross, with its old market-place, and quaint, picturesque houses. Between Ross and Monmouth the scenery is romantic and beautiful in the extreme. Every turn in the road brings fresh landscapes to delight the eye and tempt the traveller to linger and take them in more in detail. Symond's Yat is a spot that every tourist is advised to make for. Although only about seven hundred feet high, there is scarcely a hill anywhere that commands such a fascinating prospect and such a varied scene. Certainly we would advise nobody to miss it, but at the same time we should recommend a leisurely examination of the whole of this part of the river's course, which will well repay the time spent on it.

For about two miles before reaching Monmouth, the road runs close to and parallel with the river, but at a considerable height above it, and the pleasure experienced in coming down that road is one never to be forgotten.

Of Monmouth itself space forbids us to say much. The student of English literature is sure to be interested in the ancient building known as "Geoffrey's Study." Geoffrey of Monmouth was educated at a Benedictine monastery near the town, and became Archdeacon of Monmouth. To him we are indebted for the stories of King Arthur which have always been so popular in English literature.

Leaving Monmouth, we kept as close to the river as we could, and made our way to Tintern Abbey. The road passes through Whitebrook, and strikes the river a little to the north of Bigsweir Bridge; it then keeps quite close to the river, and after passing the village of Tintern Parva, we come in sight of the glorious old ruins. We cannot here enter into a description of the old Abbey; it must be seen to be appreciated, and it certainly will be appreciated if seen. The work was begun in 1269 by Roger Bigod, who figures in history, and was ready for service in 1287. Our forefathers, the masons who built our mediæval churches and abbeys, did their work well, and did not hurry over it. They did not let the work out to contractors, advertising for tenders and accepting the lowest, putting in a time clause and fining the contractor if the work was not hurried through to time; but they did work that was to last, and put their whole energy and character into it, and so we find that Tintern Abbey, although neglected ever since the Dissolution of the Monasteries in 1537, still remains a monument which only becomes more glorious with age. Near the Abbey can be seen the remains of part of Offa's Dyke, and a little farther on is the Wyndcliff, which should certainly be visited on account of the splendid view it affords.

Every tourist in the Wye Valley should take with him Ward, Lock and Co.'s excellent guide-book. This will enable him to see the most beautiful parts with the least expenditure of time and energy, and will give him advice about accommodation and travelling, while the beautiful illustrations in it will form a delightful souvenir of a most charming holiday.

TINTERN ABBEY.

(From Messrs. Ward, Lock and Co.'s Guide Books.)

May the remembrance of the trip afford to every visitor the same after pleasure as it did to the poet Wordsworth, who writes:—

"These beauteous forms,
Through a long absence, have not been to me
As is a landscape to a blind man's eye:
But oft, in lonely rooms, and 'mid the din
Of towns and cities, I have owed to them,
In hours of weariness, sensations sweet,
Felt in the blood, and felt along the heart;
And passing even into my purer mind
With tranquil restoration:—feelings, too,
Of unremembered pleasure; such, perhaps,
As have no slight or trivial influence
On that best portion of a good man's life,
His little, nameless, unremembered acts
Of kindness and of love."

POMPEII.

AT least six hundred years before the time of Christ the all-powerful Greeks, keenly alive to the beautiful, came sweeping through the Capreran straits in their triremes, saw stretching out before them the glorious Bay, and, as the prospect pleased, disembarked at the foot of old Vesuvius, then a mountain of no sinister reputation. Here they founded Neapolis (the New City), with Pompeii as its outlying suburb, amidst surroundings unparalleled for natural loveliness; and from that time till the day of its destruction the progress of the two towns was uninterrupted.

It became the miniature of the civilisation of that age. "Within the narrow compass of its walls was contained, as it were, a specimen of every gift which luxury offered to power." So writes Lord Lytton in his famous book. Civilisation, luxury, beauty, prosperity—all were here; but, it must be admitted, allied to the same corruption and degradation that was the immediate cause of the fall of Rome, their mighty over-lord. No more striking object-lesson could be given us of the appalling condition of manners and morals under the Roman Empire than these perfect ruins of this their gayest city, with its flow of life cut short as it were on the instant, hermetically sealed, and handed down to us intact—may we not presume to say, as a warning to avoid that fatal ease which follows opulence?

As one stands in the eloquently silent streets, surrounded by theatres and temples still erect in all their pride, it is with but little difficulty that we reconstruct the plan of the whole city, and recall the habits of its cultivated inhabitants. It seems but little older than Bosco Trecase, the modern Pompeii, but a few miles distant, three months ago resounding with the clatter of the "carrozza" and the harsh cry of the sambouk-seller, now still as the grave.

During the period from 80 B.C. to 79 A.D. Pompeii reached the high-water mark of its magnificence. At the commencement of that period occurred the great Social war against the sovereignty of Rome, in which the Samnites, who possessed the district all round Neapolis Bay, joined. This led to an attack on the city by the all-conquering Sulla, and after its surrender to him it remained a Roman city until its final destruction. Though centuries have elapsed since then, a record of that siege still remains in the shape of orders to the defending troops painted on the outside of two of the towers, the ochre shining redly yet, in spite of sun and rain.

This new possession of Rome's was carefully fostered by the emperors, who laid out vast sums of money upon its public buildings and defences. Caligula, Nero, Vespasian, all have left abiding monuments here in the shape of temples, baths, and statues erected at their expense, and to their honour. A peculiar characteristic of this Roman munificence is that, although lavish in their gifts to the Empire and to the public buildings of their favourite cities, they were far more economical as regards their own domiciles. Hence, what in these days we should call "model cottages," as regards size, served then to house proud patricians and retired senators.

The sea, though originally nearer Pompeii than it is now, was never within less than a mile from the city, and the port of Pompeii was on the estuary of the river Sarno, which used to flow past the city walls, but has now changed its course, and is nearly two miles off. And so, through the gates of Capri, the Roman vessels came and went, bearing wine and oil back to the mistress of the world in return for her golden luxuries; and year after year, with ever-growing opulence and pride, the tide of life flowed full in this Pagan city by the sea. Not unwarned, however, was she of her final destruction. For centuries Vesuvius, like a good-tempered giant, had slumbered so peacefully that it was forgotten, if it were ever known, that deep down in his interior raged ungovernable forces, that must soon break forth, and change the smiling country all around into a vast scene of desolation.

In A.D. 63 the city was visited with violent earthquakes accompanied by a slight eruption, but beyond a few weeks' alarm no further notice of the occurrence was taken. True, the temple columns snapped, statues fell, and precious mosaics were ripped like paper; but what of it? These gay and godless Romans had no care for the morrow, and never seemed their prospects brighter than now. So the work of restoration commenced immediately, and during the reign of Vespasian much of the art work remaining to this day had its origin, that which is now visible merely suggesting what must have then been the magnificence of the interiors.

We may fix the date of the actual destruction of Pompeii into its niche in the fabric of history with greater certainty perhaps if we remember that the Crucifixion took place about 29 A.D., and that Jerusalem was taken in 70 A.D., the conqueror, Titus, succeeding his rival Vespasian as Emperor of Rome in 69 A.D. Just ten years after came the overwhelming of the city, in which it is computed that 10 per cent. of the population, or about 2000, were destroyed: no less than 700 bodies have been found buried in the all-pervading pall of lava-ash that covered everything to the depth of 20 feet.

We need now no written description of the scene by Pliny the Younger, who saw the smoke and flame rising from the crest of Vesuvius and sailed across the Bay to save his father, losing his own life in the brave attempt at rescue. We have merely to turn up the newspaper files of a few weeks back and read through the horrors of those two weeks of volcanic visitation, imagining only that the fate which overtook Bosco Reale and Trecase was that of Naples also, and without difficulty we can elaborate the last act of the terrible Pompeian drama down to the minutest detail.

The whole of the ruins are walled off from the gaze of the curious who are unwilling to pay the few lire entrance fee, but once inside the barrier at the Sea Gate, with its crowd of importunate guides, we leap back from the present into the past. Here beneath our feet is the roadway trod by plebeian and patrician, bond and free, 1900 years ago—a roadway none too wide, according to our modern ideas (I think I made it 30 feet), paved with huge, square blocks of stone laid in a bed of concrete, scarred and worn by the rush of heavy chariot-wheels—a replica of the Appian Way that led from Rome down to Brundusium.

Away up the silent causeways we follow the loquacious guide until we reach what was the heart of all those ancient cities, the Forum—at first, simply a market-place where the fullers and the wine-sellers did business, then used for public assemblies and elections, and finally for the national games. As the city rose to

fame, however, the market square was encircled with a ring of gorgeous temples and public buildings, and adorned with equestrian statues and costly marble columns. Of these buildings the Basilica or Court of Justice was the most ornate, at the end of whose cloistered hall the elevated Judgment Seat still stands, with the condemned cells beneath, occupied on the

THE FORUM.

fatal day by two men whose manacled skeletons attest their villainy to succeeding generations.

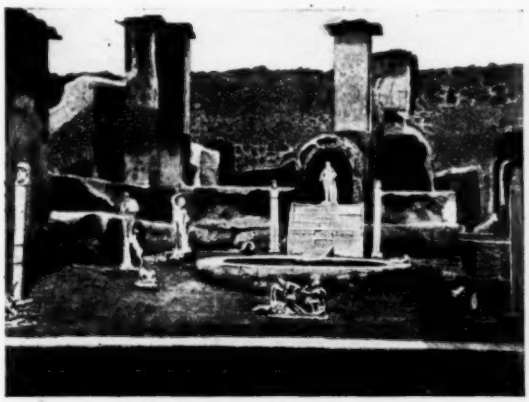
Three temples front the Forum square, in which the Pompeian paid his vows to Apollo, to Venus, or to Mercury, as he listed. Undoubtedly they were profusely adorned with paintings and sculptures, some of the rarest marbles and bronzes having been found here by the ardent excavator. As we stand before the shrine of the deity, where the high priest officiated, fancy again peoples the sumptuous interior with throngs of white-clad votaries; we hear the call of the sacrificial animals penned up in the "cella" behind us, and see the smoke rising from the huge high-altar, now green with moss, then red with blood.

From the religious exercises of the Pompeians to their amusements was but a step, consequently the Great Theatre faces the Forum too. It is a curious fact that, although the upper walls of this building have always been above-ground, no one seemed to have suspected that this indicated the position of the buried city, whose very site was completely forgotten with the passage of time. Even the celebrated topographer Cluverius was unable to fix it with certainty; and succeeding generations cultivated their vineyards and orange groves upon its lava covering, little dreaming that beneath them lay the most perfect picture of life under the Roman Empire that the world had to show, a picture more accurate and striking than could ever have been gathered from the musty pages of ancient histories.

But let us reconstruct the playhouse. The seats of stone rise tier upon tier in a semicircle like a Spanish "lonja," the foremost row being assigned to the notabilities of the city, with the "equites" behind; and at their backs, high up to the awning roofs, the common herd sweltered in the heat. The orchestra, such as it was, occupied the space before the curtain, which was lowered, not raised as with us, into a three-foot trench in front of the stage. Acting as we know it, in these days was in its infancy. The story of the plot was recited in monotone by the "chorus" grouped at the modern "wings," who chanted antiphonally, while the actors themselves, wearing buskins if tragic, or socks (that is, a kind of slipper) if comic, performed in exaggerated pantomime.

But the inferiority of the Romans to the Greeks in intellectual acquirements was nowhere more conspicuous than in their public amusements. Where the refined Grecians sought to gratify their taste by music, the fine arts, and dramatic entertainments, the Romans derived their chief pleasure from contemplating the brutal displays of gladiators; or, at best, such rich shows and processions as gratify the uneducated vulgar. Hence we have the Gladiatorial Barracks adjoining the shrine of Thespis, with its broken armour, and traces of suddenly interrupted combat, the skeletons of its refractory inmates still chained to the stocks, and its baths, frequented only by the combatants and the lower orders.

The baths proper were the Terme Stabiane, some little distance away, not only the most important baths in Pompeii, but the most perfect specimens of Roman bathing establishments existing. The bather, having prepared himself by exercise in a large court or Palæstra, entered the swinging doors of the baths opposite, and deposited his clothes in one of the niches of the "tepidarium" or cool chamber, proceeding thence into the chamber which was heated by hot air beneath the floor and within the lining of the hollow walls (the "caldarium"). On leaving this apartment he was well shampooed with perfumed ointments, scraped with a "strigil" or bronze hook, and took a final plunge into the circular marble basin near the entrance door (the "frigidarium"). He then dressed himself, and spent the rest of his day lounging in the Palæstra or the Forum. These baths were the main feature of luxurious Roman



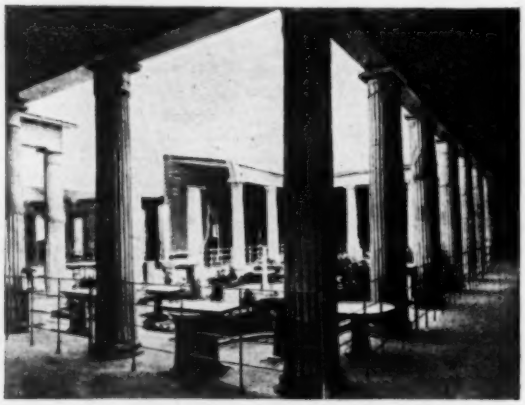
HOUSE OF LUCRETIUS.

life, and accounted for much of the degeneracy of the Roman decadence.

The further end of the baths was appropriated to the use of the Pompeian ladies, and is highly decorated still, and complete in every detail; and we have no reason to believe that the feminine world nineteen hundred years ago was less eager in the search for beauty than the professional beauties of to-day, for have we not here

jewelled hairpins, gem-studded combs, scent-bottles—aye, and even a bronze pot of rouge?

In the same street as the baths stands the House of Lucretius, so named from a letter written—or, to be more exact, painted—on the façade, and addressed to "M. Lucretius, flamen (or priest) of Mars, and Decurion of Pompeii." Entering the garden, we find ourselves in



HOUSE OF THE VETTII AND GARDEN.

the midst of a remarkable group of marble statuettes, which formed fountains and water jets in exactly the same manner as those to be seen playing to-day around the celebrated Fontana at Palermo. In the centre of the grass-grown court was a marble fish-pond, and over this pond, and upon the existing base, stood the small but exquisite bronze statue of the Faun holding a wine-skin, now in the Museum at Naples—a masterpiece of antiquity, the "throw" of whose drapery defies criticism.

In a cross street near at hand we have perhaps the most interesting of all the many fascinating houses to be seen, and one that is typical of all the other residences of the city's aristocracy. The House of the Vettii (Domus Vettiorum), as it is called, was evidently the abode of a rich Pompeian notable, as the interior walls are handsomely decorated with paintings, the colours of which appear as fresh to-day as though the artist had laid aside his brush only during the last decade.

It may interest the reader to learn the method adopted by the artists, who were mostly Greeks, for this mural decoration. The walls were divided up into panels, sometimes fantastically arranged to represent doors, windows, or balconies, and after a groundwork colour for the whole room had been painted in on the still wet plaster, each panel was filled with figures chosen from mythology, or a banquet scene, or even an incident of ordinary domestic life. Indeed, it is these paintings, many of which are portraits, which give one an insight into the life and customs of the Roman citizens, and assist one to re-people the deserted streets of Pompeii with their gay throngs.

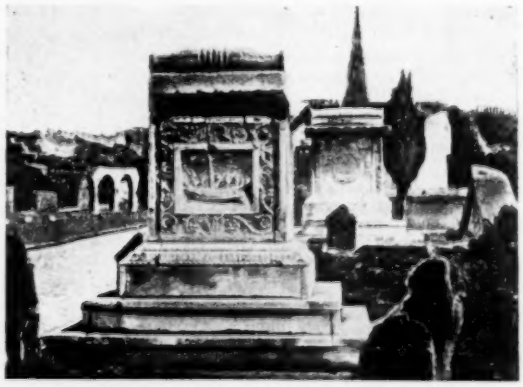
It is clear that a search-party or band of criminals must have visited the house during the eruption, and taken away from it every movable valuable they could find, the rifled strong boxes being witnesses of the deed; and with the deeds of the San Francisco "terrorists" still fresh in memory, we cannot think that human nature has changed much since the days when the Pompeian riff-raff looted the house of the noble Vettii. The paintings, fortunately, could not be taken away, and so, as we pass from room to room, forgotten incidents from Homer come crowding back to the mind. Here before us is the desertion of Ariadne, the legend of Hero and Leander, Hercules struggling in the toils of writhing serpents, and, perhaps the most striking of all, the Torture of Ixion, representing Mercury fastening the offender to the eternally revolving wheel in the presence of the acquiescent Juno.

Leaving pictures, we turn to the garden, ablaze now, as then, with all the glories of sub-tropical flora, and as we pass into the shade of the cool cloisters the gardener offers as a souvenir a bunch of Neapolitan roses, with a "Saluté, Signor!" and—a still-extended palm.

At the end of the deep-rutted Strada Sallustro, with its stepping-stones a foot high at the crossways, we see the Street of Tombs looming in the distance—a spot which affords scope for many hours of interesting study to the antiquary and the archæologist. To reach this Westminster Abbey of Pompeii we must pass under one of the treble portals of the Gate of Herculaneum, the left-hand one of which is associated with the story of the sentry who died standing at his post, immortalised in the world-famous painting called "True till Death." One regrets having to admit that the account is legendary, no matter how much we should have liked to believe it true.

The most important of the many tombs is the one erected to the honour of Munatius Faustus, to whom, according to the inscription, the honour of the "bisellium," or magisterial chair, was given by a decree of the Decurions and with the consent of the people.

The bisellium appears upon the face of the monument, and upon another side is a marble bas-relief of a ship



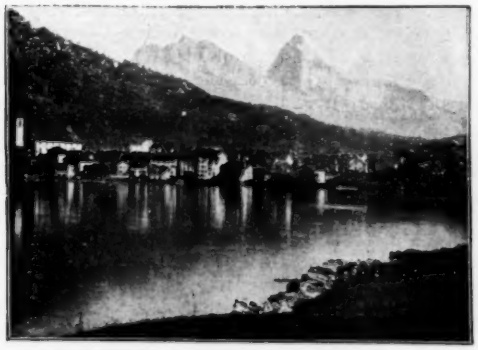
TOMB OF MUNATIUS FAUSTUS.

sailing into port, with men upon her yards furling her sails, beautifully symbolical of the close of life.

And so from the silent Street of Tombs we pass out through a wicket into the hot, dusty highway, with its cafés and beggars and clamorous drivers—a transition from the dead to the living, from the butterfly life of the Roman Empire to the poverty and squalor of the Italian *contadini*—a transition too rude to be altogether pleasant.

SWISS TOURS.

EVEN in the old days when statesmen clung most tenaciously to the doctrine of "splendid isolation," practical teachers recognised the enormous educational advantages of foreign travel; but in these days of *l'entente cordiale* and international deputations it becomes absolutely necessary for every teacher to have some personal knowledge and experience of the manners and customs of other nations. Of course, for this purpose one cannot do better than trust entirely to one's own resources, mapping out a route, wrestling with the intricacies of a continental time-table, and stopping at commercial hotels that cater for the natives and not for tourists. This, however, requires a fairly intimate knowledge of the language of the country, and also a considerable amount of self-assurance, so that probably the majority of our readers would prefer to avail themselves of one or other of the various agencies that have sprung up for the furtherance of foreign travel. In this case we should not have the slightest hesitation in advising them to place themselves in the hands of Messrs. Cook and Son, who for over fifty years have made a speciality of this work, and have built up a colossal organisation that reaches to every part of the civilised world. This enables them to offer their clients an almost infinite variety of routes and methods of travelling, arranged to suit everybody, from the experienced traveller to the novice making a first trip. The former probably only requires a railway ticket, but by forwarding the route that he intends to take, he can obtain a combined ticket that will save the bother of repeated bookings, and enable him to start off with full assurance that there are no weak spots in his plans, and that he will not have the unpleasant experience of finding that the boat does not meet the train as he thought it did, or that the coach that he had relied on for part of the journey had been discontinued. Those



BRUNNEN, ON LAKE LUCERNE.
(By kind permission of Messrs. T. Cook and Son.)

who do not feel themselves equal to bargaining with an hotel-keeper in a foreign language can provide themselves with hotel coupons, which are accepted in payment at hotels in all parts of the world, and by so doing they save the risk of being overcharged, and are also enabled to calculate beforehand the cost of hotel accommodation for the proposed trip. Those, again, who like to have everything arranged for them have the choice of about thirty personally conducted tours, which enable the traveller to obtain a maximum of sight-seeing with a minimum of trouble. The cost of the various tours varies as much as the methods of travelling, but as our readers would not consider waggon-lits and palatial hotels absolutely indispensable to an enjoyable holiday,

LUCERNE AND PILATUS.
(By kind permission of Messrs. T. Cook and Son.)

we would draw their attention to the "Popular" Tours, which arrange for second-class travelling, good comfortable hotels, with substantial meat breakfast and good *table-d'hôte* dinner in the evening, thus keeping the cost within a very reasonable limit. For five guineas a week can be spent at Lucerne; for six the journey can be broken, three days being spent at Paris and four at Lucerne or Zurich, while eight guineas secures a week at Lucerne and one in the Bernese Oberland; and a most important point in connection with these tours is that there is no booking fee or extra charge of any kind in connection with the journey or hotel accommodation. Of course, this does not include the cost of drives in the neighbourhood or excursions to more distant parts, but these can be obtained at rates that are both reasonable and inclusive, as may be seen from the following programme in connection with the Lucerne tour, which we cannot resist placing before our readers.

1. *Excursion by the St. Gothard Railway to Goeschenen.*—The steamer conveys the traveller the whole length of the lake, with its continually changing panorama of lake and mountain scenery, past Tell's Chapel and the celebrated Axenstrasse to Fluelen. The journey is now continued by rail over what is perhaps one of the finest pieces of railway engineering in Europe. The line runs up the valley of the Reuss past a succession of rugged precipices and rushing torrents, and after passing Amsteg, it curves apparently in all directions, crossing and recrossing the river, sometimes entering the mountain-side, only to reissue a little higher up after passing through a spiral-turn tunnel, until it reaches Goeschenen, which stands at the northern mouth of the St. Gothard Tunnel. Leaving the train, the excursion is continued by a magnificent walk to the Devil's Bridge and Andermatt and back, amidst scenery of the most savage grandeur.

2. *Excursion (over the Brünig Pass) to Meigingen.*—The first part of the journey is through pastoral scenery until Giswil is reached, where the first steep incline occurs and the "rack and pinion" system begins; then as the train ascends the steep gradient a fine view of the Wetterhorn with its three peaks is obtained, while below is seen the picturesque Lake of Lungern. A second steep gradient up well-wooded slopes brings the traveller to the culminating point, 3650 feet above the sea-level, from which is obtained a magnificent view overlooking the valley as far as the Kirchet. From this point the railway is carried down the steep rocks

ZERMATT AND MATTERHORN.

(*By kind permission of Messrs. T. Cook and Son.*)

by means of retaining walls and cuttings to the village of Meiringen, from whence the travellers are driven to the stupendous Gorge of the Aar. The passage of this gorge, which is made on wooden galleries fastened to the rock above the foaming torrent, will teach more to the intelligent observer of the erosive power of running water than all the books on physical geography that were ever written. After emerging from the other end of the gorge the carriages are resumed, and the travellers driven to the Falls of Reichenbach, where the stream rushes down the mountain-side some 2000 feet in seven distinct leaps.

3. *Excursion up Pilatus.*—The ascent of this mountain is made from Alpnach, by means of a mountain railway, three miles long, having an average slope of 42°. From the railway an easy path leads to the top of the Esel (nearly 7000 feet above the sea), from which, on a clear day, is obtained a magnificent view of the Bernese Alps.

4. *Carriage Drives around Lucerne.*—Carriages are provided to convey the party for a drive in the environs of the city and lake, the route taken being *viâ* Tribschen, Kastanienbaum, and Winkel.

When one finds that the inclusive fare for these four excursions, if booked beforehand in London, is only thirty shillings, we should strongly advise those who wish to see as much as possible of typical Swiss scenery in a short time to avail themselves of this opportunity.

Another interesting tour is that which has Zurich for its headquarters. This beautiful city lies in a valley between two mountain-chains, and at the head of perhaps the most charming of the Swiss lakes. Numerous villages and picturesque villas lie scattered on both sides of the lake, whose vine-clad shores form, with the snowy peaks of the Glarner Alps as a background, a picture of almost indescribable beauty. The city forms a capital centre for excursions, as it is one of the busiest railway centres of the country. An hour's ride through pasture-lands and vineyards brings the traveller to Schaffhausen, with its interesting minster and castle. These, however, pale before the majestic grandeur of the Falls of the Rhine, which are situated at Neuhausen near by. In point of volume these falls are the grandest in Central Europe, for, with a tremendous roar, the whole river takes three leaps over an irregular rocky ledge sixty feet high. The Rigi is another object of interest, which is easily reached from Zurich by taking the train to Arth-Goldau, from which point the cog-railway runs up to the Rigi-Kulm, which offers one of the finest views in the whole of Switzerland: to the south the massive peaks of the Bernese Alps rise one above the other, while to the north the eye can travel right away to the Black Forest. Instead of taking the train, however, we should advise all who can possibly manage it to follow the bridle-path and walk to the top—a stiff walk, but in no sense a climb, and the path is followed without the slightest difficulty. Instead of returning the same way, the descent may be made down the opposite slope to Weggis, from which point the steamer may be taken to Lucerne, and so back by train to Zurich in time for dinner. These are examples of day trips that may be easily taken from Zurich, but those who do not care for the fatigue of repeated train journeys will find plenty to enjoy in the immediate neighbourhood of the town itself. A trip on the lake as far as Wadenswil or Rapperswil will fill in any half-day on which the traveller feels unwilling to go further afield; and one afternoon should certainly be spent on the Uetliberg, which rises nearly 3000 feet above the lake, and affords a splendid view, embracing the Lake of Zurich, the valley of the Limmat, and the Alps from the Senlis to the Jungfrau and the Stockhorn. As the city is only such a short distance away, one can safely linger until the twilight deepens and the setting sun bathes the distant peaks in crimson light; then through the gathering gloom the lights of the city shine out, forming a regular and well-defined star pattern, while the twinkling lights of the distant villages and villas, and the glint of moonlight on the rippling waters of the lake, create a veritable fairyland.

These tours only show the more picturesque types of Swiss scenery, in which the majestic snow-clad peaks merely serve as backgrounds to smiling landscapes. Those who wish to know something of real mountain scenery should try some such trip as the ten days'

mountain tour to Geneva and Chamonix. We need hardly mention that a trip of this kind is not mountaineering, but it sheds some little light on the inexplicable joy with which the Alpine climber undergoes fatigue, toil, and danger in the pursuit of this most intoxicating pastime. By such a tour as we have mentioned, the traveller is conducted to Lausanne and Geneva, where a halt is made for three days for exploring the beauties of the lake, visiting the celebrated Castle of Chillon, and making the ascent of Mont Salève. But nothing short of Mont Blanc will satisfy the budding mountaineer, who soon arrives at Chamonix, situated at the foot of that monarch of Europe, and yet at a height of 3000 feet above sea-level. From Chamonix a large number of most interesting excursions may be made in all directions, either on foot or by carriage, but before starting on any particular trip care should be taken to ascertain whether a guide is necessary. Montanvert, the Flégère, the Brévent, and the Pierre Pointue can be easily reached without a guide; but the passage of the Mer de Glace from Montanvert to Chapeau, although perfectly safe under proper guidance, should not be attempted without. Another tour that we could strongly recommend is the week at Zermatt. This is an ideal spot for those who wish to know something of the pleasures of mountaineering, for there are many places, such as the Hornli (height, 9490 feet), which do not require a guide and yet will afford a novice a considerable amount of amusement in scrambling up the boulder-strewn sides. Those who wish to undertake something more serious cannot do better than make their maiden effort on the Breithorn, which, although among the highest peaks in the Alps, presents no great difficulty to a beginner, and, in fact, is often known as the "ladies' mountain." If this is undertaken, a guide must of course be engaged, and it is advisable to start from Zermatt overnight and sleep at the Schwarzee Hotel or at the Theodule Hut. This, of course, entails extra expense, but the experience is cheap at the price, and the view from the top is one that will never be forgotten. Even if this is not attempted, there is plenty of work that can be done without entailing any extra expense. The ascent of the Gorner Grat can be made either on foot or by the mountain railway, and when the summit is reached a most imposing view is obtained. On all sides the spectator is surrounded by snow-peaks and glaciers—the Täschhorn, the Dent Blanche, the Weisshorn (all over 14,000 feet high); Monte Rosa (15,217); and lastly that lion of Zermatt, the Matterhorn, which stands out against the sky sharp and pointed as a needle. Much may be learnt of the nature of glaciers and glacial work from the Lower Gorner Glacier, which, if a little caution is exercised, may be crossed with perfect safety.

Space will not permit us to dwell longer on Zermatt and its surroundings, for in our feeble attempt at sketching the beauties and advantages of these tours, memory has proved too strong, and we have already exceeded our allotted space; but, after all, it is the very fact that holidays of this kind do leave an impression on the mind, and give us something that we can always look back on with pleasure, that gives them their value, and forms a lasting asset for the money expended.

"I read whatever bards have sung
Of lands beyond the sea,
And the bright days when I was young
Come thronging back to me.

I fancy I can hear again
The Alpine torrent's roar,
The mule-bells on the hills of Spain,
The sea at Elsinore.

I see the convent's gleaming wall
Rise from its groves of pine,
And towers of old cathedrals tall,
And castles by the Rhine."

WHY GO ABROAD?

A VERY interesting discussion has been started in the *Daily Chronicle* by Mr. G. R. Sims, who considers that our English holiday resorts are being ruined by the rush of holiday-seekers to the Continent.

"Certain of our fashionable winter resorts are, it is rumoured, greatly distressed by the neglect they have lately experienced. Their winter season has disappeared, and if it had not been for the twentieth century habit of 'week-ending,' one or two that formerly held themselves haughtily, and pointed pompously to their visitors' list, would have become little better than Sweet Auburns by the Sea. Many of the English watering-places—*i.e.* places where you take the waters—have suffered a similar reverse of fortune; and now, if the complaints one hears in so many directions be well founded, 'the winter of our discontent' does not seem likely to be atoned for by the summer of our satisfaction. Every year it is becoming more and more the custom for the English people to spend their summer or their autumn holidays on the Continent. There are seaside towns in England which have gradually descended from the heights of prosperity to the depths of decay. You may roam along the front and see endless terraces of houses with the stucco peeling off them, and the white bills of the agent in the windows. Mansions for which the British parent was once wont to pay a fabulous sum per week for the accommodation of his wife and family are now converted into cheap boarding-houses, in which for many months in the year a melancholy middle-aged woman may be seen gazing dejectedly through the window-panes, and having the advertised 'magnificent view of the sea' all to herself."

Mr. Sims thinks that some resorts are spoiled by the readiness with which the railway companies flood them with "cheap trippers," thereby spoiling their selectness. But those health resorts in which the cheap tripper is discouraged do not seem to secure prosperity thereby.

Continental trips are now so admirably and cheaply arranged that even the holiday-maker of limited means can have a week in Switzerland, with constantly changing scenery and all the novelties of foreign fare, for very little more than it would cost him to spend the week in a seaside place at home.

But Mr. Sims's idea is, that the traveller on the Continent is satisfied with a lower scale of living than he demands here, and that at hotels equally well appointed the charges are highest on the Continent. Here we think the writer is inclined to generalise too readily.

The chief charge Mr. Sims makes against the home-land is, that the authorities of our health resorts are too parsimonious, and are unwilling to incur an outlay for making the town attractive.

"A holiday is an idle time, and the holiday-maker

can do with a great deal of amusement. Every seaside town and watering-place should have its Kursaal or its pleasure-garden, arranged on the German system, for music and coffee and light refreshments.

"I would go further, and establish in every seaside resort a well-arranged and airy ball-room by the sea, where dancing could be decorously indulged in to the music of a good band.

"If our seaside towns are to recover their old prosperity, they must move with the times, and deserve what they desire. And they will only deserve it by directing their energies to increasing the attractions of their towns, and by making those attractions widely known."

The replies that this article has evoked have been practically confined so far to the endeavour to rebut the charge that no efforts are made, or money spent, in making the places attractive. Letters have appeared from authorities in different parts setting out what has been done.

The Mayor of Bournemouth writes:—

"It may be that such enterprise does not take the form of flaming advertisements of the attractions of the town and district exhibited in different parts of the country, and that prominent advertisements are not inserted in the principal newspapers and magazines. But there is another kind of enterprise which certainly characterises Bournemouth people, namely, that no effort has been spared in making the town beautiful, clean, and healthy, and in providing plenty of amusements and means of recreation suited to all seasons of the year for visitors and residents.

"Bournemouth has many palatial hotels and boarding-houses, wherein visitors are so excellently entertained that members of the various royal families of Europe have been frequent visitors to the town, in addition to which there are more modest hostels suited to people of limited means. The facilities for outdoor sports, inland drives, and sea excursions are of the very best, while as regards entertainment Bournemouth's reputation for its municipal orchestra and several public bands is pre-eminent. The climate is mild in winter and cool in summer, and the sunshine records show, particularly in the winter and spring months, that the town can hold its own even when compared with the Riviera.

"If people go abroad it must be not because delightful conditions cannot be found at home (for they exist at Bournemouth), but because it is considered that a greater 'change' is experienced at a greater distance. It is a strange idiosyncrasy that an Englishman will go abroad because he says the difference of language, customs, and manners of the people and habit of living afford him a better change than he can get at home, but when he arrives at his destination on the Continent he at once seeks that change in a hotel where everybody speaks English, practically all the people are English, and the cooking is upon the same lines as in an English hotel, and all the associations of the place remind him of home.

"Mr. Sims in his article mentions little that the Englishman longs for that cannot be found in Bournemouth. Perhaps this is why Bournemouth's winter season has not yet 'disappeared,' and the 'twentieth-century habit' of 'week-ending' is not depended upon to fill the principal hotels and pensions during the winter months, and why there are few empty houses, although houses are being built at the rate of 400 to 500 per annum.

"Bournemouth has never openly discouraged the tripper, though it has, perhaps, on the other hand, not done much to encourage him. The character of its attractions is not such as delights the tripper, and this, combined with the distance of the town from any large centre of population, has done much to preserve the selectness of the place, the halo of which, by-the-bye, is not worn with the bad grace that Mr. Sims hints of in regard to many health resorts, but is worn with pride and satisfaction, for its selectness is appreciated by residents and visitors alike.

"Mr. Sims's hint that the burden of rates is seriously felt has no application to Bournemouth. It is notoriously lightly rated, the rates all told amounting only to 5s. in the pound for all that the corporation have provided, and it may be doubted whether the hotel proprietors do not know how to obtain supplies of food at reasonable prices."

The Mayor of Lowestoft writes:—

"A very great deal of what Mr. Sims says is true of many of our seaside resorts. That they have been neglected of late years is apparent, and the causes are many. The spirit of the age appears to be to go everywhere, and see everything, to rush hither and thither. Instead of a restful holiday, resulting in restored health and a happy return to home responsibilities, people often aim at being able to say, 'I have done this, that, or the other place.'

"The main point which naturally interests me is, 'How is my own town competing with the Continent?' and 'What provision is being made to attract visitors to Lowestoft?' I thoroughly agree with the writer that we possess beauty spots and health resorts equal to anything the Continent can show us. Lowestoft, standing as it does on the most easterly point of England, possesses the most invigorating air in the British Isles, as well as many attractions. June and September are usually the best months of the year. We hold the record for more sunshine in 1905 than any other place in the United Kingdom, as was pointed out in a recent issue of the *Lancet*. Mr. Sims is, to my knowledge, quite correct in many instances regarding the narrow-mindedness of the local authorities of watering-places in not providing and fostering harmless and inexpensive amusement for the recreation of the visitors. In our case we are different; in my visits to other resorts I have never found so much to interest one as we have at Lowestoft.

"Our south pier is unique in interest. It is so arranged as to afford a panorama of the shipping of the largest fishing port in the United Kingdom, of the yacht basin of the Royal Norfolk and Suffolk Yacht Club, and it provides a promenade 1300 feet long, furnished with a splendid military band, a pavilion, a concert hall, and a fully-equipped restaurant.

"Our beautiful parks, with bowling greens and tennis-courts, are supplied with concert parties and bands throughout the season. Fêtes and gala days are frequent, and regattas and carnivals are continually taking place. The natural heather-clad hills, and hundreds of acres of gorse and turf by the sea, with golf links, are the daily delight of old and young. The country drives and walks, too, are charming and invigorating. Few seaside towns possess so many advantages, in addition to yachting, boating, bathing, and the usual beach attractions. The lovely broads, too, are within five minutes of the town, and Dickens land is only a short walk."

OUR CLASSROOM AIDS.

THE WARBLER FAMILY AND THEIR CHARACTERISTICS.

BY P. HORN.

A GOODLY proportion of the vast host of migratory birds which sojourn in these islands between spring and autumn, are members of an interesting family known as the warblers.

The warbler family is well represented in this country.

The text-books, and more or less authentic lists of "British killed," variously estimate the number of species between twenty and thirty, but of these nearly two-thirds are strangers pure and simple; accidental visitors which have strayed or been driven here at irregular intervals owing to adverse circumstances.

However, after making the necessary deductions from the list, there remain at least seven or eight species which may claim to be either universally or locally common.

A family containing so many representatives must inevitably constitute an important factor in the bird-life of a country. Bearing this fact in mind, it is easy to see that a knowledge of the warbler tribe is a most essential branch of the field naturalist's work. Unfortunately, in spite of their universal distribution and superior numbers, the warblers are not so well known as they might be.

Before we learn the general characteristics of this fascinating group, it is well to know that all the representatives, with the exception of the extremely rare Dartford warbler, are summer migrants like the swallow and cuckoo.

The more venturesome of the family begin to make their appearance at the end of March, and from thence onwards until the second or third week in April the feathered invasion steadily increases. Undoubtedly the month of May is the best period for observation. The distribution to the breeding haunts is then in full swing, and with the absence of thick foliage the birds have no great facilities for concealment.

Added to this, the unattached males are in no way desirous of hiding their newly acquired charms of voice and plumage from their prospective mates. Later on, when they have attained their object, their natural reticence reasserts itself.

General Characteristics.—Most of the warblers are, comparatively speaking, insignificant little birds. The largest scarcely equals a sparrow in size. Neither are they characterised as a class by any peculiar brilliancy of plumage. The Wood Wren is certainly a strikingly pretty bird, but his tints of green and yellow appear pale and insipid when compared with the glorious hues of the male Greenfinch's plumage.

As if to compensate for the want of brilliant plumage, nature has endowed our friends with a superior elegance of form.

A typical warbler is slim and delicately built; its body outline is undeniably graceful.

The claws are similar to those of the other perching birds, such as the finches and tits. The long slender beak differs but slightly from that of the thrushes, proclaiming the bird to be an insect eater. Though they are of migratory habits their short rounded wings render them incapable of performing the aerial evolutions of the swallows, consequently we usually find them inhabiting the trees and bushes.

Most of the warblers are shy and retiring birds, skulking in the cover of dense copses and hedgerows.

Though several of the species evince a partiality for orchards and sequestered gardens, they are by no means easy of observation during the breeding season, and it is most difficult to dislodge them from their haunts.

All the warblers are insectivorous birds.

The Blackcap certainly varies its menu with an autumn repast of elderberries, and occasionally in summer we hear of it resorting to the cherry orchards.

The staple diet of the family consists of caterpillars. One of the species, the Lesser Whitethroat, is an indefatigable larvæ hunter. Its antics, when searching for the tiny green caterpillars which infest the young foliage of the oaks in spring, are scarcely inferior to the acrobatic performances of the tits.

The Willow Wren extends its sphere of influence by attacking the winged insects. The masterly manner in which it sallies forth from a bare twig in pursuit of passing flies, occasionally deludes the unwary novice into the belief that he has seen a phenomenally early Flycatcher hovering and twisting in the distance.

This brief description could scarcely be considered complete, unless mention were made of the vocal powers of the family. Considering the size of the warblers as a whole, the power and compass of their voices is truly remarkable; an unmistakable joyousness and abandon pervades their songs.

The ordinary calls and alarm notes are such as might be expected from such small birds, but when the males

are lustily challenging their rivals, the whole neighbourhood resounds with their voices.

Many of the Blackcap's notes are scarcely inferior in volume and purity of tone to those of a song-thrush.

The diminutive Chiffchaff and Willow Wren are prime favourites with the naturalist solely on account of the vigorous manner in which they proclaim spring's return. Neither do their voices lack melody. If a bird lover were asked to select the six best British songsters, two at least, the Blackcap and the Garden Warbler, would be found in the list.

When once the typical warbler is known, it is hardly possible for the merest novice to confuse any of the family with the tits, crows, or finches, but to distinguish between a "warbler" and certain members of the great "thrush" family is not such an easy matter.

The superficial resemblance between the two is certainly very great, more especially when the birds are of similar size.

The Nightingale, for instance, is classified as a "thrush," though, as regards habits and song, it should apparently be assigned a place between the Whitethroat and Blackcap warblers.

The scientific method of classification is based mainly on the character of the plumage.

Naturalists say that no true warbler has a speckled plumage. In the earlier stages of its existence the immature Nightingale has a spotted breast, though after the first moult it loses this characteristic; but the fact of its showing this affinity to the thrushes is considered sufficient reason to class it with the latter birds. The plumage of the warblers is more or less *uniform* at all periods of their existence. The adult Sedge Warbler, it is true, can boast of a few faint stripes on the upper parts, but even in this case the breasts of both old and young birds are of a uniform pale grey.

There is still another distinction in connection with the plumage.

Both thrush and warbler renew their feathers in the autumn in the usual manner. The latter tribe, however (it is significant that they are great travellers), undergo a second or *extra moult* in the spring preparatory to setting out across the seas to their summer breeding haunts. Thus the warblers are able to appear to advantage in a new suit of clothes when they pay court to the females; whereas the thrush family have to be content with the raiment which has served them through the storms of winter.

As a further means of identification we must look to the legs, or, to be more correct, that hard shiny portion of the foot (known as the tarsus) lying between the toes and the joint where the feathers begin.

If the front surface shows indications of being scaled, there are usually three very faint transverse grooved lines; then the bird is probably a warbler; certainly not a thrush, which has a perfectly smooth tarsus.

The three foregoing are scientific distinctions, and not practicable to the average bird-lover. There is no rule of thumb for the guidance of the beginner. Consistent and patient field work is the secret of success.

In his own humble opinion, the writer's method is worthy of consideration.

Find a suitable locality and work it regularly every week-end irrespective of weather. Learn each individual species as it appears, and be ever ready to investigate the source of strange bird calls.

Field glasses are extremely useful, and occasionally the outdoor work should be supplemented by a visit to a museum or good collection of bird skins.

It is astonishing how quickly the eye and ear become educated to the subtleties of voice, carriage, and plumage which characterise each genus.

By following out the above plan, the novice will soon be transformed into an expert.

As stated previously, the spring is the best time for observation, but there still remain three months before the warblers depart. Appended is a brief description of the common warblers.

	Plumage.	Habits, &c.	Song.
CHIFFCHAFF . .	Olive brown above, dull white below, with a faint suspicion of yellow on the throat and sides of breast. Feet black.	Universally distributed. Smallest warbler and earliest spring migrant. Keeps to shelter of trees and thickets.	Two or three deliberate notes separated by an interval of about a sixth, ejaculated alternately. The most conspicuous spring song.
WILLOW WARBLER (Willow "Wren")	Similar to above, but larger and brighter in colour. Yellow is more pronounced. Feet light reddish brown. Pale streak above eye.	Arrives in mid-April. Universally distributed and partial to orchards. Occasionally hovers when picking caterpillars from the twigs.	Pleasing and joyous. A descending series of seven or eight notes, best heard in spring. Call note, commonly heard in late summer, "tu-it."
WOOD WARBLER (Wood "Wren")	Similar to both the foregoing, but brighter and slightly larger. Primrose yellow beneath, fading to white lower down. Upper parts yellowish green. Well marked yellow streak over eye.	Similar to above. To be looked for in beech woods.	After a few stammering spluttering notes the bird apparently stumbles into its song, a high-pitched bubbling trill.
WHITETHROAT .	Warm brown above, dull white below. Male has pinkish tinge at side of breast. Eye very pale brown, almost yellow.	Universal and common. Frequents every hedgerow, and is usually betrayed by its harsh alarm notes. Occasionally indulges in short upward flight, singing meanwhile.	An eccentric jumble of chattering notes, often uttered in flight. Alarm note, a harsh "churr," expressed with a most amusing appearance of indignation.
LESSER WHITETHROAT . .	Slightly smaller than above. Greyer on the head and back.	Prefers to keep to the foliage of the larger trees.	A monotonous trill preceded by a few soft chattering notes. Alarm note, a soft "check."
SEDGE WARBLER	Upper parts pale brown, with faint dark streaks. Under parts dull white. Well-defined white streak above eye. Tail rounded and ruddy brown.	Shy and retiring. Skulks in dense hedges and vegetation near waterside. Sings continuously, and occasionally ventures forth like the whitethroat.	A medley of loud chattering notes hurriedly uttered and interspersed with imitations of the swallow, finches, and sparrow, more especially the latter bird.
BLACKCAP . . .	Greyish breast, jet black crown. Females and young have brown caps.	Shy and retiring. Affects dense copses and woodlands.	Extremely loud and rich. Contains harsh notes, but many of the trills and flute notes are worthy of the nightingale and thrush.

COURSE OF LESSONS IN DOMESTIC SCIENCE.

BODY HEAT AND CLOTHING.

Step I. Preparation.—1. Revise what was taught in the first lesson concerning the generation of heat during chemical action, and emphasise the fact that the heat of the body is produced in this way by the oxidation of the tissues.

2. *Conduction.*—Take a piece of copper wire about 12 inches long, and with a little wax fasten along it a number of small weights or buttons; stick a cork on one end to serve as a handle, and hold the other end in the flame of a Bunsen burner. The part in the flame soon becomes red-hot; the heat, however, is not confined to this spot, but travels along the wire, as is shown by the weights falling off one after another as the wax melts. Substances that allow heat to pass through them readily are called good conductors of heat. If this experiment is repeated with a piece of platinum wire, the children will be able to compare a good conductor with a bad conductor. These terms are, of course, only relative, there being no hard and fast line between the two classes. Most metals are good conductors, silver being the best, followed in order by copper, gold, brass, and zinc; whilst wood, paper, wool, etc., are bad conductors, and so are most liquids and gases. If the palm of the hand is covered with a little lime, a red-hot poker can be laid across it without hurting the hand, for the air enclosed in the lime, being a bad conductor of heat, protects the skin from injury.

3. *Radiation and Absorption.*—When a kettle of boiling water is left to cool, it loses most of its heat by *radiation*, and the rate of cooling depends largely on the extent and nature of the radiating surface. This may be shown by means of two cans, the outside of one being brightly polished and the other covered with lamp-black; water placed in the dull can will cool much more rapidly than that placed in the polished can.

4. *Latent Heat.*—Whenever a liquid evaporates, the vapour carries off a large amount of heat, which does not affect its temperature, and is therefore known as "latent heat." This may be shown by means of the wet and dry bulb thermometer; but a more striking illustration is afforded by making a little pool of water on a piece of wood, and placing in this pool a beaker containing ether; by blowing into the ether it will be made to evaporate so rapidly, and to carry off so much heat, that the water beneath the beaker will be soon frozen, even on a warm summer day.

Step II. Presentation.—All systems of heating have two objects in view: (1) that a constant temperature should be maintained; (2) that this temperature should be the same in every part; and every one knows the difficulty there is in attaining these objects, especially in large buildings, for, whatever may be the system adopted, the rooms near the source of heat are warmer than those more remote, and, of course, the heating apparatus cannot automatically adapt itself to sudden changes of temperature. A few moments spent in considering the defects of our methods of warming a large building will impress on the scholars the beauty of the arrangements for maintaining the body at a constant temperature. As we have already seen, the heat of the body is generated by the oxidation of the tissues in every part of the body, every little bundle of capillaries affording an opportunity for this oxidation to take place; and the heat thus generated is carried off by the blood, and so distributed evenly throughout the body. Hence we see the importance of a good circulation if the body is to be maintained at a good temperature; for the blood first of all brings the fuel that produces the heat, and then distributes the heat after it is produced.

Now let us see how the body is maintained at the same temperature both in summer and winter. On a very cold day the body would, of course, part with its heat more rapidly than it would on a hot day, and so special arrangements are made to prevent this. When the body is exposed to a low temperature, the arteries that bring blood to the skin contract, so that less blood comes to the surface to part with its heat; on the other hand, when there is considerable external heat, a large supply of blood comes to the skin to be cooled down; and further, this cooling process is assisted by the sweat, which pours out of the sweat-glands, and carries off a large amount of heat as it evaporates.

In addition to these natural means of counteracting the effects of change of temperature, human beings also have to resort to artificial means in the form of clothes. This fact is often disregarded, and clothes are looked upon as means of personal adornment; but although beauty is one of the points to be considered in the selection of clothing, comfort must always come first. The following are the most important points to be remembered in the selection and arrangement of our dress:—

1. *The clothing should prevent loss of heat from the surface of the body.* The extent to which a given material meets this requirement depends on its conductivity and its radiant power. Of the materials usually employed for clothing, fur and wool conduct heat much less rapidly than linen or cotton. Air, too, as we have seen, is a bad conductor, so that loose clothing and loose materials retain the heat far more than tight garments and close textures. The radiant power of a material depends on the colour and nature of its surface, light-coloured materials being good reflectors and bad radiators, whilst dark materials absorb heat readily, but also part with it quickly. This point was investigated by Franklin, who placed a number of different coloured squares of cloth on the snow, and found that most snow was melted under the black cloth and least under the white.

2. *The clothing should have good hydroscopic properties*—that is to say, it should be able to absorb moisture without its surface becoming wetted, for moisture will absorb a large amount of heat for a slight rise in temperature. For this reason it is much better to wear flannel next the skin than linen or cotton.

3. *The clothing must not interfere with perspiration.* For this reason waterproof clothing is unhealthy, and should not be worn for a longer period than is absolutely necessary.

4. *The clothing must be loose.* This is important for many reasons: (1) loose clothing is, as we have already shown, warmer than tight-fitting garments; (2) tight clothing prevents free play of the limbs; (3) it is liable to derange the position of the internal organs, and it impedes their action; (4) it hinders the circulation of the blood. This is a most important point, but the application of the general principle to individual garments must be left to the discretion of the teacher.

5. *The clothing must be equally distributed over the*

body. This is a point on which the dictates of fashion often lead to evil results, the lower part of the body being abundantly clothed, while the neck and upper part of the chest are left bare.

Step III. Association.—*Clothing Materials.* Man's first effort at providing himself with clothing was naturally to cover himself with the skin or fur that had served to protect some animal from the cold, but now we derive our materials from the vegetable as well as from the animal kingdom.

Wool is our most important clothing material; it retains the heat of the body, being a bad conductor of heat, and also very loose in texture; it readily absorbs moisture, and should always be worn next the skin both in summer and in winter.

Silk is a worse conductor of heat than cotton or linen, and being light and pleasant to the skin, is often used for under-garments instead of wool by those who can afford it.

Leather, being tough, strong, pliable, and impervious to moisture, forms a suitable material for boots and shoes; but the last-mentioned property has its corresponding disadvantages, which must be guarded against.

Fur is a very warm material, but fur garments should not be worn for long periods, as the skin impedes the evaporation of the perspiration.

Cotton is cheap, and therefore forms one of our principal clothing materials; it is manufactured into an almost endless variety of materials—calico, longcloth, sateen, velveteen, flannelette, etc. The last-named variety is loosely woven to resemble wool, and on account of its looseness of texture is much warmer than calico, but it cannot be regarded as a substitute for flannel. *Flannelette is highly inflammable*, and too much caution cannot be exercised in its use.

Linen conducts heat far more readily than cotton, but it is still preferred by many, as it is soft and agreeable to the skin, and has a whiter appearance than calico.

Step IV. Formulation.

1. The body must be kept at a temperature of 99° F.
2. The heat is produced by the oxidation of the tissues.
3. The temperature is regulated (1) by the flow of blood to the skin; (2) by the sweat-glands.
4. Clothing should fulfil these conditions:—
   (*a*) It should be non-conducting.
   (*b*) It should absorb moisture readily.
   (*c*) It must not interfere with perspiration.
   (*d*) It must be loose.
   (*e*) It must protect the whole body.
5. The chief clothing materials are wool, silk, leather, fur, cotton, and linen.

Step V. Application.—*Taking Cold.* 1. Although the regulation of the flow of blood to the skin takes place automatically, it naturally takes a little time to effect a change, and the skin must not be suddenly exposed to a low temperature while it is in a condition suitable to a high one, or before the blood-vessels can contract so much heat is lost that serious, or even fatal, results are almost sure to follow.

2. *Amount of Clothing.*—This will depend on age, climate, amount of food, state of health, etc. Anything that diminishes the supply of heat, such as insufficient food, poor circulation, etc., must be compensated by extra clothing to retain what heat there is. The clothing must be adapted to the climate and season of the year, but in such a changeable climate as our own it is most important that the clothing should not be changed too early in the year. It has been said that in this country winter clothing should not be put off until Midsummer Day, and should be resumed the day after; but without going quite so far as this, it is wisest not to put off winter clothing on the first few warm days, and having discarded any thick garments, they should not be packed away in inaccessible places until it is quite certain that they will not be required again until next winter.

3. *Choosing Clothes.*—In choosing clothes three points must be considered—health, beauty, and economy. Most of the teaching in our lesson has been directed towards the first of these points, but the other two must not be disregarded; it is now generally recognised that a costume being healthy does not necessitate it being either eccentric or expensive; the shape can be altered and modified to suit the prevailing fashion without violating the laws of health, and the very wide range of materials now on the market places a beautiful and hygienic dress within the reach of every one.

NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON PLANT LIFE AND SOIL.

BY EDWARD J. RUSSELL, D.SC. (LOND.),
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Changes during the Growth of Plants.

THE visible changes should be set out by the children in a connected way, and should include the changes during germination, the seed leaves, the ordinary leaves, the flower, and the seed.

Germination was dealt with in Experiments 18 *et seq.*, p. 402 (Feb. 1906). A good variant on Experiment 18, and one very useful in a revision lesson, is

Experiment 57.—Pour some water into a graduated glass cylinder and read the volume. Then put in a definite number of seeds, and take a second reading of the volume: the difference gives the volume of the seeds. Allow them to germinate, and make periodical measurements: the increase is very evident even with small seeds.

The distinction between monocotyledons and dicotyledons may be illustrated by the germination of wheat or other cereals and grasses, which only have one seed leaf, and beans, which have two.

As the plant develops the seed leaves fall off, new leaves and shoots are constantly appearing, and the foodstuffs absorbed go to form these new tissues. Some of the substances we have found in the plant are, however, formed more rapidly than others, and the composition of the plant changes as it grows. The general trend of the changes is to decrease the percentage of water and of protein, and to increase the percentage of starch and cellulose, particularly of the latter.

Experiment 58.—Use young grass and old grass, or young cabbage and old cabbage, or other plants grown out of doors under natural conditions.

Weigh out equal amounts of each, and cut up fairly finely with scissors, dry in an oven, and weigh the residue. The loss of weight can, without sensible error, be called water, provided the temperature of the oven has not exceeded 90° or 100° C. If you have no oven, make two pieces of apparatus as nearly alike as you can in the following way:—Fit a test tube with a

bored cork, connect with a piece of glass tubing to a U tube, so that the test tube and the limbs of the U tube are approximately parallel. Into one test tube place the finely divided young plant, into the other the fragments of the old plant. Insert the test tubes in a beaker of olive oil, and the U tubes in a beaker of cold water; apply heat to the oil beaker. Note that the two substances are being treated identically, and observe that more water is given off from the young plant than from an equal weight of the old plant. This fact is in accordance with the common experience that young plants are more "juicy" than old ones.

Experiment 59.—Set equal weights of young and old grass or cabbage to rot. The plants should be put in saucers, and moistened with a soil extract obtained by shaking good garden soil with water and filtering. This extract contains numbers of bacteria of the most varied kinds, which attack and break down the tissues at a speed depending on the temperature, moisture, and other conditions. A warm, dark corner is the best for the purpose, a certain amount of water is always necessary, and a renewal of the bacteria may be desirable.

It will be found that the young plant decomposes more quickly than the old one, and leaves much less residue. The easily decomposable substances are first attacked, leaving a fibrous mass of cellulose, which only slowly breaks down: the old plant contains more fibre than the young one. This fact is also in accordance with experience: the "stringy" nature of old kidney beans is a case in point.

The writer is not aware of any simple experiment showing the changes in the percentage of protein in plants.

Analyses of clover at different stages of growth have given the following results:—

	Flower Heads Invisible.	Early Bloom.	Full Bloom.	End of Flowering.	Ripe.
Water	86·00	85·59	74·96	71·65	33·47
Dry matter . .	14·00	14·41	25·04	28·35	66·53
The dry matter contained—					
Protein . . .	23·61	17·19	14·81	14·40	14·06
Fibre . . .	13·37	20·08	24·62	25·28	26·60
Mineral matter .	10·57	10·22	6·85	7·02	6·21

The children at Wye School knew that farmers prefer young grass for their animals; it was now evident why they should do so.

Flowering and Seed Making.

Only the chemical aspect of the subject will be dealt with here.

The object of the flower is to produce seed, and when seed formation is complete the stem and leaves usually die; in the case of annuals the whole plant dies. During flowering the vital processes in the plant are intense; and when seed formation begins, the starch, protein, and mineral matter stored up in the leaves and stems are transferred to the seed.

Experiment 60.—Examine the leaves and stem of a wheat, barley, or oat plant after ripening: show the very low percentage of water and the absence of starch. Heat a portion in a test tube with some soda lime; little or no ammonia is given off, showing that only small amounts of protein are present.

The experiments in the first of these lessons showed that the seed contains starch, protein, and mineral matter in some quantity; it is now clear that these must have migrated to the seed from the rest of the plant.

The preservation of the race is always more important than that of the individual. A large number of experiments have shown that no matter how unfavourable the conditions may be, the plant will produce seed if it is possible to do so within the space of time the plant can tolerate the conditions. Further, the seed produced is in all cases much the same in composition, though not in quantity. Thus maize has a fairly constant chemical composition, whether it is grown in North America, South America, Australia, or Russia; whether it has been highly manured and well cultivated, or whether only the most primitive methods have been adopted. Wheat also furnishes another instance; the limits of variation are somewhat wider, but the difference in quality which causes Manitoba wheat to make a big loaf and English wheat to make a little loaf quite unacceptable to the English housewife, is not correlated with any equally marked difference in chemical composition. When a slight variation in composition does appear, it can probably be perpetuated by the methods of the plant breeder.

The Soil.

Constituents of the soil. (1) Water.

Experiment 61.—Fit a test tube with a cork through which passes a short piece of glass tube drawn out to a point. Put some dry soil into the tube, and heat; steam is evolved, but no combustible gas appears to be formed.

When, in Experiment 3, seeds were heated in a similar tube, both water and a combustible gas were obtained.

Experiment 62.—Heat some soil in the apparatus used for Experiment 58: clear water alone is produced. In the parallel experiment with seeds (Experiment 2), a tarry liquid distilled over.

Experiment 63.—Put some soil into a wide glass tube ($\frac{1}{2}$ inch diameter), closed at each end with corks fitted with short glass tubes; then attach at one end a U tube kept cool with water; to this join a small flask containing lime water, and fitted with a cork containing two tubes, one just dipping into the flask, the other dipping under the lime water. It is now necessary to pass air through the apparatus; this may be done with bellows, or, more conveniently, by means of an aspirator. Heat the soil; occasionally a small particle burns in the current of air; water condenses in the U tube, and the lime water in the flask becomes somewhat turbid, showing the presence of carbonic acid.

When seeds were treated in a similar way they burned readily, giving quantities of water and carbonic acid.

It is thus evident that even dry soil gives up water on heating, and evolves some carbonic acid; usually a small amount may be seen to burn in the tube. The differences in behaviour shown by seeds and soil are rather differences in degree than in kind, and the general conclusion we come to is that dry soils contain some water, and some combustible matter like that found in plants, or, to express this last phrase in two words, some "organic matter."

Experiment 64.—Weigh 4 or 5 grams of dry soil into a porcelain or metal dish, and heat for some time at as high a temperature as you conveniently can. Observe that after cooling the residue weighs but little less than the original soil; it has the colour of terra-cotta, a name the appropriateness of which is now obvious.

COMMON-SENSE NEEDLEWORK.

BY MISS FLEMING,

Authoress of "How to Teach Needlework," "Pupil-Teachers' Needlework," "Sewing-class Guides," etc.

INTRODUCTORY REMARKS ON DRILL.

"Drill should not last longer than five minutes, and should only be taken as an introduction to the needlework or knitting lessons."—*Extract from "Suggestions."*

IT is the aim of these papers to indicate methods to be adopted in carrying out the instructions contained on page 77 of the "Suggestions."

Drills help to secure prompt obedience. They are simultaneous movements designed to accustom the muscles of children's hands to perform actions at words of command. They also cultivate habits of observation and imitation, and train the muscles. In the hands of a skilled teacher they are of inestimable use for large classes.

In teaching them, each movement should be slowly and clearly explained and illustrated, and, when the class is familiar with what is expected, short words of command may be used; afterwards, numbers only are required. Some teachers use the left hand for the right hand when demonstrating to young children. This is a matter of opinion, but the teacher cannot always work in a left-handed fashion.

Thimble Drill.

Although apparently so simple, this drill will not be accomplished perfectly by very little ones in one lesson. A thimble must be placed on the left of each child, with the hole downwards. Then a little practice must be given in holding the right hand "up" and "down," and the same with the left, until every one is quite certain which to use. The placing of the fingers, previous to taking up the thimble, will require a little patience in teaching, as the muscle movements are not so easy as might be supposed.

Practice must also be given in closing and opening, first the right hand and then the left hand, then closing the right and extending only the thumb and the first finger.

The next step will be to lift the thimble with the thumb and first finger of the right hand. The same action should be repeated with the left hand.

A second lesson may be devoted to the following movement, as it is a difficult one for children.

The teacher will open the right hand, and close the fingers, leaving only the longest one up. Much muscular control is needed for this, so that the little pupils must not be expected to do it properly the first time.

There remains now only the placing of the thimble on the fingers.

Such detailed instruction may not be necessary for experienced teachers who have thought out carefully for themselves all the difficulties that are likely to beset the path of the little learners, but the aim of these papers is to be useful to young teachers, as well as those of riper age.

Any ingenious girl will be able to modify this and all other drills to suit herself and her own class. A slavish adherence to suggestions is not intended, nor even desirable.

After the second lesson the drill will be something like the following:—

Summary of Thimble Drill.

1. Show right hand.
2. Close the hand, leaving long finger up.
3. Take up the thimble with left hand.
4. Turn the hole of the thimble and long finger of the right hand to face each other.
5. Put thimble on.

Needle Threading.

When this is taught to "tiny tots," "threaders" should be used. They are very large needles, about the size of a tape needle, the eye of which is round, and the point blunted.

Fine cord or twine, which will pass through the eye easily, and which has a knot at the end to prevent it slipping out, is supplied with each needle. The usual preliminary practice with left and right hands should be given.

The next step will be to hold up the needle with the left hand, so that the little ones can see through its eye, and then so that they cannot see through it.

Now the cotton is to be taken up by the thumb and first finger of the right hand—about an inch from the end.

Lastly, the cotton in the right hand is to be brought slowly towards the hole of the needle in the left hand, and pushed through the eye.

The right hand may then take hold of the cotton that has pierced the eye, and draw it out as far as it will come; the knot will prevent it slipping through.

Some of the foregoing items may require rehearsing before further progress is made:—

Summary of Needle Drill.

1. Lift up the needle with the left hand.
2. See that the eye is right.
3. Take hold of cotton with the right.
4. Bring both hands together, resting three fingers of left hand against three lower fingers of right hand, and pointing cotton to the eye of the needle.
5. Pull it through.

At first, when the children are pulling the cotton through the needle, the teacher should slowly count twenty—the number being reduced at each subsequent practice.

Work-holding Drill.

Papers with the hem folded are needed. These should be laid on the desk with the fold facing upwards.

The class should be required to point to the right and left ends of the paper. The name of the fold ("hem") should be taught.

The teacher should close her left hand, and open the thumb and first finger, both having their insides facing and touching each other.

The class copies the movement.

When teaching the subsequent steps, the teacher should be in such a position that the class can see her use her hands exactly as she wishes them to use theirs.

For this purpose she will stand with her back to the class, having her head and hands turned, so as to show the proper method.

The teacher will:—

1. Take up the right end of the fold by means of the thumb and first finger of the right hand.
2. Take hold of the fold by the thumb and first finger of the left hand, so that the thumbs are about one inch apart.

3. Place the fold over the end of the first finger of the left hand, and bring the middle and other fingers over it.

Summary of Drill.

1. Take hold of right end of fold with thumb and first finger of right hand.
2. Take hold with left hand, placing left thumb about an inch away from right thumb.
3. Place work round the end of first finger of left hand, and bring the other fingers over it.

Hem Stitch-making Drill.

1. Put the thimble on.
2. Place the work over the end of the forefinger of the left hand.
3. Put the needle eye to the thimble, and hold the needle between the thumb and forefinger, close to the point.
4. Point the needle to the middle of the thumb-nail (through the hem).
5. Push the needle through with the thimble, and turn work to see that the needle "shines."

N.B.—See that the thimble does its work so thoroughly, that the eye of the needle is pushed quite into the hem.

6. Draw the needle out.

All this must be done with unthreaded needles on paper, and the process repeated until a continuity of motion is kept up.

In the next lesson fresh strips of paper are fixed and the needle threaded, but the cotton is left unfastened.

This time an additional movement is introduced.

The place of the cotton is always between the second and third fingers. It *must not* be grasped in the hand.

When the thimble has pushed the needle's eye into the work, the thimble finger is raised, ever so slightly, to allow the cotton to slip into place as the hand is being drawn away from the work.

It would be well now to insert in the foregoing drill another step.

5*a*. Raise thimble finger, and let cotton slip into place.

It may take several lessons to get this done properly, but when it is accomplished, the greatest obstacle to easy, graceful sewing is removed.

All this time the teacher's place is in front of her class. It is not necessary to go to a single child. Her eye should quickly detect any who cannot follow the detailed instruction. After giving time for a distinct effort to be made, instead of going to those who have not grasped the teaching, the class should be stopped and the teacher go again through every movement. This she will constantly need to do, using the verbal directions with the action, as long as she feels it to be necessary. She will notice the futile efforts of the backward ones, and stop the class every little while to watch them. Indeed, it is this doing on her part, and the *watching* on the children's part, that make or mar the teaching of needlework.

It is only in the earlier stages that it will be necessary to turn the work over to see if the stitch is taken through. After a little practice the children will be able to *feel* whether it has gone through or not. Indeed, they must be trained to do that, as the constant turning of the work militates against the continuous movement of the sewing, which is so very essential.

Fixing.

This is so very important that it deserves a chapter to itself. Not that fixing is to be considered as a separate exercise. It must be the rule not the exception, for each child should be able to do all her own fixing, when the general method has once been taught.

As most terms such as "narrow," "broad," "deep," etc., are comparative, it is obvious that some guide must be given to assist immature judgment. Whatever means the teacher adopts to impress the fact that the first fold is always to be a narrow one, only wide enough to prevent the edges fraying, it must be done, otherwise thick clumsy hems will be laid, that cannot be worked neatly.

Without insisting upon measurements, I suggest, as a guide to the teacher, that the first fold for either hemming or seaming be about an eighth of an inch.

The fixing itself is best taught on paper, and whenever extra practice is required, paper can be used. Many strips will be needed before skill is acquired. A paper that will fold easily without tearing is essential.

Fixing Hems.

After showing a laid hem, elicit that it is made by folding the paper once, and then doubling the fold over again, so that the new edge is enclosed "or hemmed" in. The teacher proceeds to show how that is done. She should stand sideways with her back partially turned towards the class, having her hands turned to the right, and holding them up so that the class can see what she is doing. In this way the children will not be puzzled as to left and right hand, etc. Holding a strip of paper so that all the class can see it, she commences about an inch from the top right-hand corner. She will then:—

1. Turn the paper down (impressing the necessity for "narrow" fold) with thumb and first finger of right hand.
2. About $1\frac{1}{2}$ inches farther along the same edge, proceeding towards the left, turn down the same width as before with thumb and first finger of the *left* hand.
3. Stroke the back of the fold thus made with the middle finger of the left hand.
4. Push the first finger of the left hand, with the paper over it, between the thumb and finger of the right hand in the form of a pleat, which is pressed firmly.

These steps are repeated all along the strip, the children being called upon to note specially how straight and flat the stroking makes the fold, and how the pressing it firmly, fixes it into place.

Some teachers of sewing object to method of pressing the folds with the fingers because it creases the article, and takes away the "spic and span" look of "show" work. Practical devices that produce dexterity of fingers is our aim.

The fold then requires doubling over in the same fashion, the teacher going through each part with verbal directions.

The class then, step by step, proceeds to copy what the teacher has done. Her quick eye will notice who has not understood the directions, and she will stop the class to show the method again, *telling* and *doing* following each other alternately.

Hems are always fixed on the wrong side of calico, which is rather fluffy, the right side being smooth and glossy.

Tacking the Hem.—The teacher will allow the class to gain some proficiency in fixing before she commences with the tacking. The stitches are about half an inch long and the same distance apart.

As the under fold might slip down, it will at once be seen that the stitches must pass through three thicknesses to make all secure. So the tacking thread will come a little below the middle of the hem. A knot may be used for this purpose.

If the fixing or tacking stitches are made too large, the fold is not kept in place, and an irregular hem or puckered work is the result. The word "basting" is used in some parts of England to denote tacking.

Fixing Seam and Fell.

Two strips of calico are required for each girl. Some conversation should take place between teacher and class as to the difference between hem and seam—former only one piece, the latter two which are to be joined and made neat—and the parts of garments on which both are used, etc.

Specimens with the seaming completed, but not having the fell worked, may be exhibited. The girls will then see its use, which is to enclose the raw edges of both pieces and to make the join more secure.

The methods adopted in teaching hem-fixing are applied.

Narrow folds are to be made on both strips by the method already detailed, but one strip will need another and backward fold, deeper than the first one, to form the fell. The two edges are placed face to face, the top edges, which are to be seamed, being kept quite even.

Care must be taken not to pucker one side on to the other. A pin placed in the work at each end, and one in the middle, will be of assistance.

Seams must always be tacked before they are sewn. After girls have fixed a few seams, they feel so clever they will omit the tacking, and consequently the uneven work has to be undone.

If the exercise be held up to the light it will easily be seen how far the folds inside extend, and the class will be able to tell where the tacking threads must come, *i.e.* in the middle.

If placed too near the edge, they get in the way of the seaming; if too far down, the edges of the exercise are not kept firm and even.

Tape Loops and Strings and Strengthening Tapes for Repairs.

Tapes of varying widths are used for different purposes.

They are secured to articles in the shape of a square, or, when the tape is very broad, in the form of an oblong. The width of the tape gives one side of the square. The raw edge of the tape is turned down once and laid face downwards on the wrong side of the calico, and hemmed round three sides. The fourth may be either seamed or backstitched. The stitches should all show through clearly, or else none show through at all.

The free end of the tape is hemmed neatly on the wrong side, *i.e.* the side on which the tape is fixed. The ends of narrow tapes may be buttonholed to prevent curling up, as a hem would be rather clumsy.

To form a loop the tape is turned over and the loose end secured by means of another square side by side with the former one. If the stitches are crossed in the centre between the two tapes, additional strength is added.

Tapes may be made to serve a useful purpose in strengthening the edges of sheets, towels, and tablecloths that are beginning to crack. A strip of tape, the length of the part requiring support, is tacked along the edge of the cloth on the wrong side. The raw ends of the tape are turned down once and the outer edge seamed to the article, the other three sides being hemmed.

Uses of Tapes.—For fastening clothing and house-linen, such as aprons, pinafores, drawers, shirts, pillow-cases, etc., and for strengthening weak places. The strengthening of vents will require a chapter to itself.

How placed.—For straps for children's drawers, and where the garment is intended just to meet, the tapes are set at the edge.

If one side is meant to overlap the other, the tape on the overlapping side will be sewn *under* the band at the edge, while the tape on the underlapping band will be sewn on the upper (or right side of the garment), sufficiently distant from the edge for the requisite overlapping of the top part. This method applies particularly to a baby's flannel or barracoat, one set of tapes being placed several inches from the edge on the right side.

For pillow-cases, also, the tapes are set on the broad hem about an inch from the edge. If two sets of strings are required for a pillow-case, it must be divided into three parts, *e.g.* 1 X X 1. If three sets are needed the pillow-case will be divided into four parts, 1 X X X 1. The tapes are sewn on the places indicated by the crosses.

OUR ILLUSTRATED GEOGRAPHICAL NOTE-BOOK.

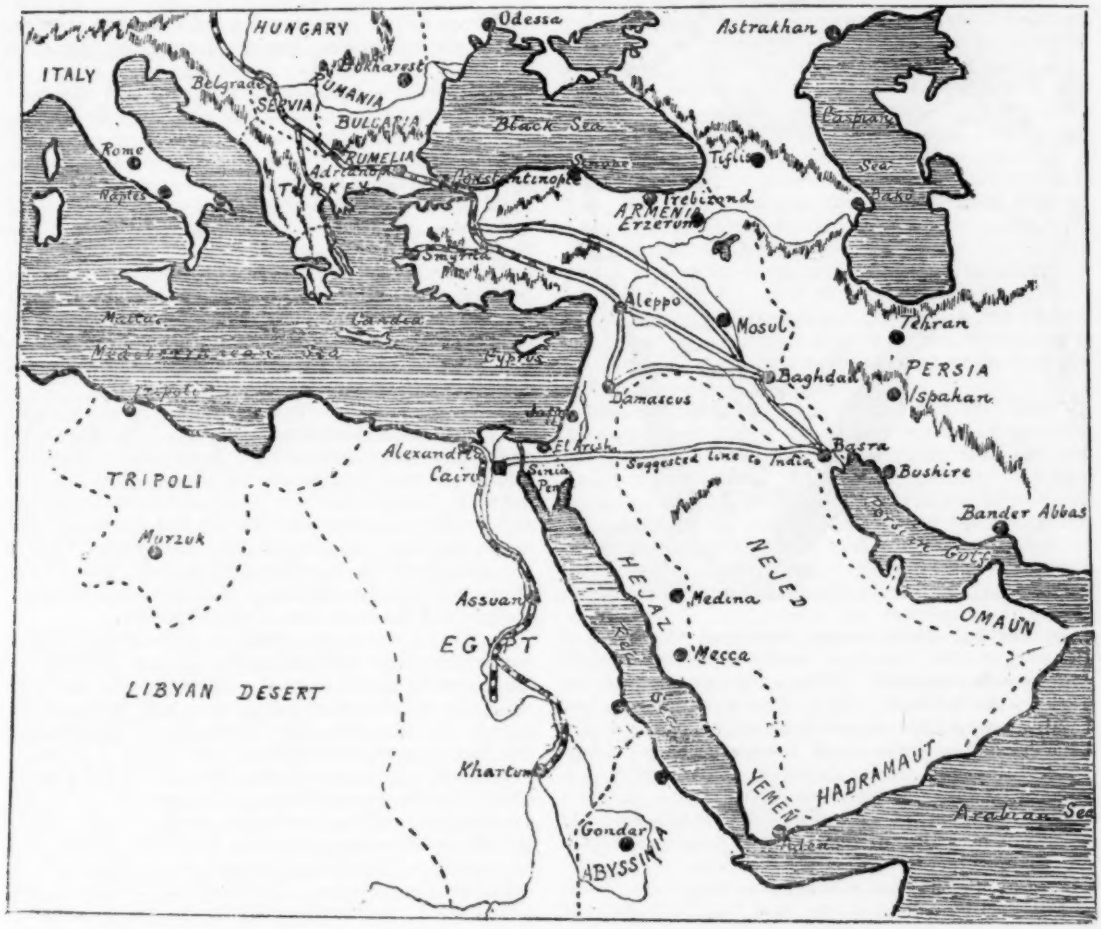
THE MISRULE OF THE TURK—THE SINAI BOUNDARY DISPUTE.

THE carving out of nations was ever accompanied by bloodshed, and an empire with continuous possessions in three continents was little likely to prove an exception to the general rule; and, indeed, in this respect the Turkish empire easily holds the most evil reputation among the nations of the world. Though in modern times the Turk has been despoiled of considerable tracts of territory, he still holds sway over the following:—

Immediate Possessions—	Sq. Miles.	Population.
Europe . . .	65,350	6,130,200
Asia	693,610	16,898,700
Africa . . .	398,900	1,000,000
	1,157,860	24,028,900
Bulgaria, including E. Rumelia . . .	37,200	3,744,300
Bosnia and Herzegovina . . .	19,800	1,591,100
Crete	3,330	310,400
Cyprus	3,710	237,000
Samos	180	54,840
Egypt	400,000	9,821,100
	464,220	15,758,740
	1,622,080	39,787,640

Turkish domination is synonymous with corruption, treachery, cruelty, and every undesirable feature that marks incapable government. Turkey for centuries has been a disturbing factor in the politics of Europe; and lately ill-judged Turkish aggression on the borders of Egypt brought the Porte into possible conflict with Great Britain. A few facts concerning the history, extent, and economic features of the Sultan's dominions cannot but be of interest at the present juncture.

The Rise of the Ottoman Empire.—The exact origin of the Turks is not very clear, except that they came from the regions of Central Asia, gradually combining with other Asiatic races under the influence of Mohammedan creed and conquests. In 844 the Turks entered Armenia, from which time may be dated their influence in Europe. The Turkish empire was consolidated, if not founded, in 1299 by Othman, from whom the Turks obtain the name of "Ottomans." Othman seized all the old Roman possessions in Asia Minor, and his grandson, Solyman, crossed the Strait of Bosphorus and practically subdued the remainder of the Eastern Roman empire, only Constantinople holding out against the invaders. Bajazet I. (1389–1402) was a great sultan who conquered a great deal of European territory. He was conducting operations against Constantinople when Tamerlane, a Tartar tyrant from the interior of Asia, appeared upon the scene. Tamerlane captured Bajazet, and carried him about in a cage. The Tartar, however, retired, and the Turks, after an interregnum of a quarter of a century, recovered themselves under Mohammed II., in whose reign Constantinople became the capital of the Turkish dominions (1453). In this same century the Turks seized Albania, Greece, and Crimea, and in the sixteenth they seized Syria, Egypt, Tripoli, Tunis, and a large portion of South Russia. Hungary was invaded, and even Vienna invested.



The bare enumeration of these conquests indicates the marked military aptitude of the Turks. Had they only been able to hold all that they had won, the Turkish empire must of necessity have become one of the most extensive and most powerful in the world.

The Declining Star of Turkey.—In the seventeenth century the star of Turkey commenced to decline. In the year 1595 the Turks were expelled from Hungary and Transylvania, and for a time at least they retired from Moldavia and Wallachia. Russia declared war against her in 1769, the result of which was the loss of further territory, for Russia gained the Crimea, and brought her boundary to the river Bug; and it was

agreed that the Russian fleet should have the right of free passage through the Dardanelles. In 1806–12 further hostilities enabled Russia to extend her boundary to the river Pruth. In 1822 the Greeks made a bid for freedom, and, thanks to the intervention of the Great Powers gained their desire. Russian designs on Turkey caused the Great Powers to guarantee her integrity and independence in 1841. The Crimean War (1854–57) was practically in support of this agreement, but nevertheless it resulted in Roumania securing at least a partial independence.

The years 1876–78 effected a great change in Euro-

pean Turkey. Russia again interfered on behalf of the subject races, who were cruelly ill-treated by their Mohammedan masters. After a terrible struggle, the Turks were subdued. Had Russia enjoyed a free hand, she would have seized Constantinople, and would have driven the Turks out of Europe. The provisions of the Treaty of Berlin arranged matters otherwise. Austria administered Bosnia and Herzegovina; Bulgaria became independent, and Rumelia semi-independent; Thessaly was added to Greece; and Russia received a portion of Armenia south of the Caucasus.

Present Conditions.—Turkey has long been designated the "Sick Man of the East," and the affairs of the empire are in a state of such disorganisation that outside interference will be a necessity in the very near future. It will be convenient to consider briefly the chief divisions separately.

TURKEY-IN-EUROPE.—The territory of 230,000 square miles has now dwindled down to one-fourth that area. Though the land is remarkably fertile, and the climate is favourable to the production of all the vegetable wealth of southern Europe, agriculture is at a very low ebb. The conditions of life under Turkish rule are so wretched that the people have little heart to engage in labour other than sufficient to keep body and soul together. Only a governing race with a perfect genius for organisation could hope to preserve peace and concord in a country that contains such a mixture of races, creeds, manners, and customs. We see in Austria-Hungary the constant turmoil by antagonistic nations, languages, and beliefs, but in Turkey the diversities are far more marked. The outstanding source of trouble is the fact that the Turks are Mohammedans, and they expose their Christian subjects to brutal treatment, constant spoliation, and, not unfrequently, death. Manufactures, except carpets, perfumes, and tobacco, are practically non-existent. The Turks practise no arts or sciences, and have failed to add to the world's knowledge anything in the shape of an invention in any branch of human activity. They have, too, largely refused to avail themselves of the discoveries of others. They possess a few railways, but they are the worst in Europe. Constantinople, the capital, is typical of the country. Possessing every advantage that favourable situation can bestow, and the envy of the conquerors of all ages, the city is chiefly remarkable for its insanitary smells. It is a pity that the jealousies of the great nations prevented its acquisition by Russia. Russian government has not distinguished itself in the eyes of Western civilisation, but it would have been a vast improvement on the rule of the Sultan.

TURKEY-IN-ASIA.—Asiatic Turkey possesses unbounded interest for the whole of Christendom. Here was the cradle of the Christian religion. On the plains of Mesopotamia are the ruins of Babylon and Nineveh, the only traces left of the great empires of Chaldæa and Assyria.

"The Babylonians were not only a great military power, but a great commercial nation. The Euphrates and Tigris were navigable for large vessels from the middle plains of Chaldæa to the Persian Gulf. A vast network of canals and water-courses carried prosperity and fertility to the whole district, and where now the wandering Bedouin hurries over arid wastes fruitful palms and golden harvests once waved. The silence of solitude and the stagnancy of desolation have taken the place of the busy hum of industrial life."

Anatolia possesses the greatest area and the largest population of the divisions of Asia Minor. Where the land is well watered crops of excellent wheat are possible, and the orange, olive, fig, vine, mulberry, valonia, poppy, etc., flourish. Throughout the steppe regions the Angora goat is reared, and goat's hair is a staple export. Along the coasts, and especially in the vicinity of the islands, sponge fishing is important. In recent years various railway concessions have been granted to British and German syndicates, but little progress has been made. Turkish government is a blight upon all commercial enterprise. Almost all the trade and commerce are in the hands of the Greeks and Armenians. The latter have suffered terribly at the hands of the Turks. Periodically whole villages are massacred, and frequently European intervention has been threatened. There is not only inveterate hatred between the Turks and Armenians on account of their religions, but the latter are the capitalists and the money-lenders of the country. Their methods of business are by no means commendable, and there is truth in the proverb that "An Armenian is as bad as nine Jews."

Palestine, the scene of our Lord's sojourn on earth, the homeland of the Jews, notwithstanding the centuries of effort of the Crusaders, still remains in the clutch of the infidel. The land once flowing with milk and honey is in large areas absolutely barren.

Arabia.—This huge plateau, buttressed by steep mountains, contains vast areas of desert. The Arabian horse, camel, and donkey are noted for their excellent points. "Mocha" coffee from the Yemen region, and frankincense and myrrh from the Hadramut valley are the only productions worth notice. The political divisions are ill-defined and complicated. The province of *Hejaz* is important in Turkish eyes, in that it contains Mecca, the birth-place of Mohammed, and Medina, his burial-place. To these holy cities every year come vast numbers of Mohammedan pilgrims. *Yemen* is important only on account of its coffee. *Nejed*, once a powerful state, is practically independent; and *Hadramut* is largely influenced by Britain through her possession of Aden. *Oman* is under an independent sultan in alliance with Britain through political relations with India.

TURKEY IN AFRICA.—*Egypt* suffered Arab and Moslem conquest in 641, and was made part of the Turkish empire in the latter part of the twelfth century. Napoleon the Great took possession of the country in 1801, but was forced to evacuate it by Great Britain. In 1811 Mehemet Ali revolted from Turkey, and in 1830 the Egyptians conquered Syria. Syria was restored to the Sultan, but the office of Khedive of Egypt was recognised as hereditary. In 1873 the Khedive secured the right of treating with foreign powers and maintaining an independent army. In 1882 Arabi Pasha headed a military rebellion, and Great Britain occupied the country to restore order to ensure the protection of the Suez Canal. British occupation has worked wonders for the Egyptians, and where anarchy and bloodshed were the rule, peace and commercial prosperity now reign. The suzerainty of the Sultan of Turkey is still acknowledged by the payment of an annual tribute.

Tripoli.—Turkey has held Tripoli since 1551. Much of the country is a waterless region, but grain, wine, and cotton are produced where water is obtainable.

In recent years Italy has endeavoured to establish interests in the country, and when the time arrives the Turkish possession will pass to the Italians.

The Sinai Boundary Dispute.—Except for its strategical value it would be a matter of small importance who held Sinai, for the region has not improved since the Israelites murmured against Moses for leading them into its sterile confines. The inhabitants are estimated at about 30,000. Turkish diplomacy is always marked by features peculiarly their own, and it is not quite evident why the Sultan has embarked upon a policy that would necessarily irritate Great Britain. The Sinaitic frontier appears to present no element of doubt, for it runs in "a straight line from a short distance to the east of El Arish to the head of the Gulf of Akabah, but excluding the fort of Akabah."

Turkish troops have been stationed at various points well within the territory of Egypt, especially at Tabah, which is eight miles from the boundary. At Rafah, at the other end of the boundary, the same aggressiveness has been exhibited. In some quarters it is suggested that Turkey by some roundabout method desires to reopen the question of the British occupation of Egypt. The suggestion is not an unlikely one, and in all probability the construction of the Hedjaz railway has some bearing upon the matter. The Turks have never been energetic railway engineers; but in the construction of the new line from Damascus to Mecca they have exhibited an almost feverish anxiety. Two years ago it reached southwards to Maan, but what point has now been reached nobody appears to know. The work has been effected by Turkish troops, superintended by German engineers. German influence in Turkey is a factor that cannot be disregarded, and it may prove that the Sultan is but a catspaw in some deep-laid scheme of Germany. At the moment of writing there had been presented to the Porte a British note equivalent to an ultimatum. As a result of this the Turkish troops were withdrawn from the territory in dispute pending delimitation of the frontier on the basis of the arrangement made in 1892.

Should the Sultan prove obdurate, Britain will be launched on a war pregnant with points of complication. The war strength of the Turkish army is about one and a half million men; and the Turk is a born fighter, to which must be added the fervour of the Mohammedan fanatic against the Giaour. The attitude of the Egyptians is perhaps uncertain; for though British occupation has meant the financial salvation of the country, the influences of creed and association draw the people towards the Sultan. The Mohammedans of the Sudan would certainly rise in the cause of Islam, and our Mohammedan subjects in India would extend at least their sympathy to Abdul-Hamid. Press exigencies will not allow waiting for definite developments, but by the time these lines reach our readers the dogs of war will have been unloosed, or once more the Sublime Porte will have climbed down from an untenable position.

Conclusion.—How much longer will the Turk be allowed to blot one of the fairest regions of southern Europe? It is a glaring anachronism that the continent that has sent out teeming millions to people other parts of the world, and that has carried and still carries civilisation and Christianity into the dark places of the earth, should retain within her own borders an alien people like the Turks. Often during recent years the constant massacres of Christians in Macedonia have threatened to bring down the vengeance of Europe upon Turkish misrule. A great Bulgarian leader said recently:—

"We want a big massacre! It is the price we shall have to pay. We shall provoke the Turk into such a massacre that Europe will—must—intervene. I know Europe is getting sick of the Macedonian muddle. But Europe has got to be stirred. The only thing to stir it to interfere and take Macedonia from Turkey will be a great massacre of Christians. That is the way by which Macedonia will get its liberation."—(*Pictures from the Balkans*).

But this point alone by no means covers the question. Here close to the congested countries of western Europe is the whole of Asia Minor, with a climate suitable for Europeans, and with natural wealth awaiting energetic exploitation. The Turks will not devote any energy towards the improvement of their heritage, and the area is capable of supporting a vast population. The time must surely come when the Turks will have to give way to vigorous energetic peoples, who will bring all the advantages of civilisation to the country that has for long centuries groaned under the desolating rule of the "unspeakable Turk."

OUR TUTORIAL SECTION

NEW SCHOLARSHIP COURSE FOR 1906-7.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

Work for the Month.

PART I.

1. *Reading.*—Regular oral exercise must be taken in this subject, as well as a good deal of silent reading. Good readers are scarce, because few study the subject properly. As such a large part of a teacher's time is taken up with talking, it surely is necessary that the cultivation of the voice should receive careful consideration, and if this were done there would be fewer cases of the disease known as sore throat or laryngitis, which is generally caused by straining the larynx by adopting an unnatural pitch. Clear and distinct enunciation, easy pace, deep breathing, an ingratiating manner (if one may use the term), are the characteristics of a good reader, to whom it is always a pleasure to listen. The mere monotonous repetition of words, however correct, is the reverse of pleasant or stimulating, and produces a mental dulness in the listener which frequently ends in sleep. As much earnestness must be put into the reading as into any other exercise.

2. *Recitation.*—Learn the next twenty lines. The same remarks apply to this as to reading.

3. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and use great care at all times. This is another exercise which is too frequently taken for granted. The specimens I am continually marking are distinctly poor; the reasons are obvious and the cure easy. The style adopted may be any, but it must be regular, easily legible, beautiful in form, and capable of rapid production. It is by attention to the minutiæ that improvement is made. The elements of which the letters are composed are only some half-dozen in number, and can be learnt in five minutes (see *Copy Book*). Those who are weak in the subject should assiduously practise the combinations, *e.g. oadqq, brevr, illmnhup, jgyz, minimum*, and aim at speed, equal spacing, and regularity. The pen should not ordinarily be removed from the paper in writing a whole word.

4. *Composition.*—Apart from the formal exercise in essay-writing, composition is an important part of every written exercise. A student may know facts, but unless he can clothe them in appropriate language, he fails to secure a high mark. Of all the various questions sent up to me the commonest is, "How can I improve my composition?" The answer is easy, the method difficult—by systematic training. A horse does not win the Derby by accident; for months before the event there is suitable practice, every care and attention is given to food and health, and no pains are spared to make the physical condition perfect. And so it should be with any student. Every earnest attempt to improve produces some advantage. To write well you must think well, to think well you must associate with minds superior to your own, and endeavour to rise to their level. In these days of free libraries and cheap literature you can obtain the cream of all the greatest intellects for a few shillings; drama, history, geography, fiction, poetry, philosophy are placed within the reach of all—only too frequently to be put on one side for rubbishy scraps and snacks that may amuse and titillate the empty-headed, but which are useless and pernicious. A book worth reading is called "dry." I have often heard the term applied to Scott's novels, Lamb's essays, and even to such books as *Westward Ho!* The amateur critic in passing this judgment is confessing to his own utter impotence to appreciate, for, as Emerson says, what the whole world acclaims must be worth something. Set aside a few minutes of every day for serious reading, for hard reading of some well-known book. You may only be able to get through a couple of pages and understand them, but you have then mounted a step. If you have time, endeavour to reproduce the substance of what is read; in this way you unconsciously adopt phrases and expressions which will improve your style. Be in deadly earnest over the matter, and although you may feel, as you undoubtedly will, that your efforts are crude and immature, persist steadily. As soon as you are eminently dissatisfied with your composition you are on the high-road to success, for you have learned at any rate to distinguish good from bad.

Essay-writing is merely a test of what company you have been keeping. If you have filled your mind with petty thoughts you must betray yourself; if you have associated with the immortals you will reflect a little of their glory.

Write one or two essays each week. Two hours per week is the minimum which should be given to the subject. If the subject is one with which you are unfamiliar, read up all you can about it, think it well over, make out a skeleton plan to ensure clearness and logical order, and express your ideas in the best language at your command. Revise again and again, strengthening what is weak, eliminating what is redundant, and making clear what is obscure and confused. As more advice can be given individually, send up a specimen essay monthly. I shall be pleased to give a small book prize for the best essay on any of the following subjects:—

(1) "Some books are to be tasted, others to be swallowed, and some few to be chewed and digested."
(2) Gardens.
(3) The duty of a teacher towards the child.
(4) An ideal holiday for a teacher.
(5) An original fairy tale.
(6) Does civilisation produce increased happiness?
(7) Insects and their use to man.
(8) The character of Hereward (as depicted by Kingsley).

The following notes may be of assistance in dealing with these subjects:—

(1) The well-known dictum of Bacon, true enough in his days, is eminently so nowadays, though probably he would have added a fourth class, "those fit to be burnt." To such a practical and philosophic mind as that of Bacon, it was obvious that, of the books in his library, many might be useful for reference; for occasional reading, but to devote much time to their perusal would be to waste it. Others, again, were of the character that they might be read through easily, without any serious demand on the mind, and dismissed as soon as read; but the third class composed those books which demand serious thought, prolonged and concentrated attention. Although few of us could classify literature as tersely as Bacon, we must agree wholly with his opinion. Enlarge upon this classification and quote instances of the various classes.

(2) *Gardens.*—"God Almighty first planted a garden, and indeed it is the purest of human pleasures," says Bacon. The Englishman is particularly fond of his garden, whether it be the acres surrounding some stately home, the narrow strip of the suburban villa, the small plot of the city house, or the window-box of some slum attic. The reason for the deep attachment is easy to find; it is some trait of the race derived possibly from the life of freedom of the old Anglo-Saxon. The centuries have gradually cut down the miles of forest in which he was free to wander to a square yard and a sunflower, but, with the pertinacity of his race, he still clings to the small patch which is essentially his own. The growth of a few stunted flowers gives him more pleasure than all the beautiful trees in the neighbouring park. "A poor thing, but mine own." There is an "earth-hunger" in the race, of which the garden is one small sign. Psychologically, a garden is of value by widening thought and interest—"Children, like gardens," says George Eliot, "cause forward thought." Anything which will win the

mind from the sordid cares of the modern money-making world to the contemplation of the beauties of nature is to be welcomed.

(3) This should not require much help. It is difficult to estimate the power which a well-trained mind like that of the teacher can exercise over the budding faculties of a child at the most impressionable age. The upward or downward career often dates from the class-room, and the tendency may be given by an entirely unnoticed action. It is not only in the formal lesson, but in the manner and speech, that a teacher exercises great influence. Watch a number of little children at play. The probability is they are playing at school, and it is amusing and instructive to see the fidelity with which the little teacher mimics the speech and gesture of her mistress. The day's lessons may be gone and forgotten, the *personality* has created an ineffaceable impression. In my early days of entrance in a large class, I had a teacher for a time whose name and appearance I have quite forgotten, as I possibly have all he tried to teach me; but one thing I remember most vividly. All the time he was lecturing us, he held a piece of chalk in his right hand, which he continually threw up a few inches, so that it turned over *once* before he caught it again, never more than once and never less. The regular rise and fall of the chalk fascinated me, so that I heard little of what was said. And it is such little things that impress themselves upon a child's memory. The teacher, therefore, must watch carefully not only what he says but what he does with regard to his class.

(4) This must be left to the individual judgment. The holiday of a town teacher would take an entirely different form from that of a teacher in an isolated village; but in any case it should be a real holiday—a recreation that sends one back the better in body and mind. From continual association with children whose minds are inferior, the young teacher too frequently adopts a mental attitude of superiority which is most objectionable to those who are not children, and a holiday should be a severe corrective of this.

(5) A very good exercise in composition is the production of an original story. It is a change from the continual reproduction of ideas—other people's, very frequently.

(6) Happiness is not an easy state to define. It is a condition of the mind produced by circumstances which affect different people in very different manners. What produces happiness in one, would produce misery in another and indifference in a third. Wealth does not cause it, for Solomon's wealth and wisdom only produced the cry, "Vanity of vanities! all is vanity;" and modern millionaires commit suicide to escape misery. Health does not give it necessarily (although it usually is a factor), for the happiest people are often those who suffer from continual disease and pain. You will remember the story of the Persian king who was assured of happiness if he would exchange shirts with a man who was entirely contented and happy. After a long search the man was found, but he had no shirt! As happiness is such an elusive condition, civilisation has little to do with it. People were happy when they were cave-dwellers, and people will still be unhappy when every one is Master of Arts and Doctor of Science.

(7) The more one studies nature the more one is struck by the wonderful economy with which everything is arranged. Everything has its use, although on superficial inspection it may not be apparent. In no case is this more true than in the insect world. They are nature's scavengers, without whom the world would scarcely be habitable. They remove all the putrid matter which would speedily become a nuisance. Leave the body of a small animal, such as a mouse, near an anthill, and see in what a short time nothing but the skeleton is left. Although the woods and fields are full of birds and small animals which die in great numbers, it is comparatively rare that one is found dead, unless the death is quite recent. Other insects fertilise the flowers, without which we should have no fruit; others assist the gardener by working in the earth, burying manure, rendering the soil permeable to air and rain.

(8) This will be a good test of your reading. Put down all the qualities you have observed in *Hereward* and illustrate by reference to acts in his life—*e.g.* his bravery and courage, his good qualities as a leader, his diplomacy, his patriotism, his courtesy and chivalry, his vanity, which allowed him—as many another good man—to be fooled by the smile of a woman.

5. *Arithmetic.*—Vulgar Fractions and their application to concrete quantities.

Read up the theory very carefully and prepare exact definitions of Fraction, Numerator, Denominator, Vulgar Fraction, Simple, Compound, Complex, Proper, Improper Fractions. Be prepared to prove the rules for cancelling, addition, subtraction, multiplication and division of fractions, by diagrams.

(*a*) In working out complex fractions be sure to make the working quite clear by keeping the solution of each part in a vertical line. The following is a correct method:—

Simplify $\dfrac{9\frac{1}{2}\div 6\frac{1}{3}}{9\frac{1}{2}-6\frac{1}{3}}\div\dfrac{16\frac{2}{3}\div 11\frac{1}{4}}{16\frac{2}{3}+11\frac{1}{4}}\times 17\frac{9}{14}$

$$=\frac{\frac{19}{2}\times\frac{3}{19}}{\frac{57-38}{6}}\div\frac{\frac{125}{8}\times\frac{4}{45}}{\frac{185+90}{8}}\times\frac{241}{14}$$

$$=\frac{\frac{3}{2}}{\frac{19}{6}}\div\frac{\frac{5}{2}}{\frac{275}{8}}\times\frac{241}{14}$$

$$=\frac{9}{19}\div\frac{20}{55}\times\frac{241}{14}$$

$$=\frac{9}{19}\times\frac{55}{20}\times\frac{241}{14}$$

$$=\frac{2171}{140}=156\tfrac{11}{140}$$

Small pieces must not be taken and worked from left to right. If this is done the whole will be helpless confusion.

(*b*) In comparing the value of fractions, note particularly that they may be reduced to a common denominator or a common *numerator*, whichever is easier.

E.g. compare the values of

$$\frac{3}{149},\ \frac{4}{175},\ \frac{6}{297},\ \frac{12}{586}.$$

This may be done (*a*) by reducing each numerator to unity—

$$=\frac{1}{49\frac{2}{3}},\ \frac{1}{43\frac{3}{4}},\ \frac{1}{49\frac{1}{2}},\ \frac{1}{49\frac{5}{13}};$$

(*b*) by bringing each to a common numerator 12—

$$=\frac{12}{596},\ \frac{12}{525},\ \frac{12}{594},\ \frac{12}{586}.$$

(*c*) In evaluating such expressions as $\frac{3}{17}$ of 2 tons 7 cwt. 3 qr. 21 lbs. do not reduce the latter to lbs. and make a fraction of it. Multiply the whole by 3 and divide by 17.

(*d*) A common form of problem is—

"A man, after spending $\frac{1}{3}$ his money and then $\frac{1}{3}$ of the remainder, and then $\frac{1}{4}$ of what then remained, had £25 left. How much had he at first?"

These may be solved in two ways: (*a*) taking the original quantity 1 and finding what fraction was left; (*b*) by working *back* from the last item.

E.g.: Method (*a*)—

His 1st remainder was $1-\frac{1}{3}=\frac{2}{3}$
" 2nd " " $\frac{2}{3}-(\frac{1}{3}$ of $\frac{2}{3})=\frac{1}{2}$
" 3rd " " $\frac{1}{2}-(\frac{1}{4}$ of $\frac{1}{2})=\frac{3}{8}$
Then £25 was $\frac{3}{8}$. ∴ whole amount was £100.

Method (*b*)—

£25, 0s. 0d. was $\frac{3}{8}$ of the last sum. ∴ that sum was £33, 6s. 8d.
£33, 6s. 8d. " $\frac{2}{3}$ " 2nd " ∴ " " £50, 0s. 0d.
£50, 0s. 0d. " $\frac{1}{2}$ " 1st " ∴ " " £100, 0s. 0d.

The latter method is often the better where the fractions are accompanied by other quantities.

E.g.—A man spent half his money and 6d., then half the remainder and 3d., then three-fourths of the remainder and 1d., and had 5d. left. What had he at first?

Working backward—

(1) 5d. is 1d. less than a quarter of the last sum which = 2s. 0d.
(2) 2s. " 3d. " " half " " 2nd " " = 4s. 6d.
(3) 4s. 6d. " 6d. " " half " " 1st " " = 10s.

The following are some Departmental questions on fractions:—

(1) Prove as to children that $2\frac{4}{15}+3\frac{2}{3}=5\frac{14}{15}$.

(2) Two men take steps of $2\frac{2}{3}\frac{1}{4}$ and $2\frac{1}{4}\frac{1}{5}$ feet. If they start in step and walk side by side how far will they have walked before they are in step again and how many steps will each have taken? Ans. $187\frac{1}{2}$ feet, 63 and 64 steps.

N.B.—G.C.M. of two fractions $=\dfrac{\text{G.C.M. of Numerators}}{\text{L.C.M. of Denominators}}$;

L.C.M. of fraction $=\dfrac{\text{L.C.M. of Numerators}}{\text{G.C.M. of Denominators}}$.

(3) Prove that a fraction is divided by a whole number when its denominator is multiplied by that number.

(4) How would you show that $30\frac{1}{4}$ sq. yds. make 1 sq. pole?

(5) Prove that if the numerator and denominator of a fraction be both divided by the same number, the value of the fraction is not altered (*e.g.* $\frac{1}{10}=\frac{2}{20}$). Illustrate your answer by half-crowns and sixpences.

(6) Explain clearly as to a class the error in the following:—

$$\frac{3}{4}+\frac{2}{7}=\frac{3+2}{4+7}=\frac{5}{11}.$$

(7) How would you prove to children that
(a) One-seventh of three is the same as three-sevenths of one.
(b) That if A is five-ninths of B, B is nine-fifths of A.

(8) Write down $\frac{5}{7}$ in words.

(9) What is the difference between

$$\frac{\frac{1}{2}\text{ of an acre and a half}}{\frac{1}{640}\text{ of a square mile}}+\frac{\frac{1}{2\cdot 0\frac{1}{4}}\text{ of }\frac{3}{10}\text{ of 2 sq. poles}}{242\text{ sq. yds.}}?$$

(10) How can you tell *without working* that the following is wrong:—
Of the fractions $\frac{1}{4}$, $\frac{11}{4\cdot 11\frac{1}{2}}$, $\frac{2\frac{1}{2}}{11\frac{1}{2}}$, the third is greatest.

(11) Express the following fractions with a common numerator, $\frac{5}{12}$, $\frac{5}{24}$, $\frac{5}{36}$, $\frac{5}{72}$, $\frac{5}{144}$, and arrange them in ascending order of magnitude.

(12) Show that $\frac{3}{4}\div 6=\frac{1}{8}$.

(13) What is meant by dividing $\frac{3}{4}$ by $\frac{1}{8}$.

(14) Show how to perform the following subtraction without reducing the mixed quantities to improper fractions:—

(i) $44\frac{1}{3}-43\frac{1}{4}\frac{7}{7}$; (ii) $45\frac{1}{4}\frac{7}{7}-43\frac{1}{3}$

(15) How can you tell at sight how this is wrong—

$$\frac{5}{12}+\frac{7}{12}+\frac{1}{12}=1\frac{1}{2}?$$

(16) Point out the unnecessary slips in (a) and (b) and the fault in (c), giving a corrected edition in each case.

(a) $\frac{1}{2}\frac{3}{3}\times 7=\frac{1}{2}\frac{3}{3}\times\frac{7}{1}=\frac{8}{1}\frac{1}{1}=6\frac{8}{11}$
(b) $\frac{1}{2}\frac{3}{3}\times 13=\frac{1}{2}\frac{3}{3}\times\frac{1}{1}\frac{3}{3}=\frac{1}{1}\frac{4}{1}\frac{9}{1}=12$
(c) $\frac{1}{2}+\frac{2}{3}=\frac{3}{6}+\frac{4}{6}=\frac{7}{6}-1=\frac{1}{6}-\frac{3}{10}=\frac{1}{15}$

Write the question to which the result given in (c) is an answer.

(17) Prove that if two fractions A B (with whole numbers for their numerators and denominators) are equal, then A's numerator × B's denominator = B's numerator × A's denominator.

(18) (a) In what sense can £10 be divided by 2.
(b) ,, ,, ,, ,, £10 ,, ,, ,, 2 shillings.
(c) Divide 2 hours $4\frac{2}{3}$ minutes by $1\frac{1}{10}$.
(d) ,, ,, ,, ,, $1\frac{1}{10}$ minutes.
(e) ,, ,, ,, ,, $1\frac{1}{10}$ tenth minutes.

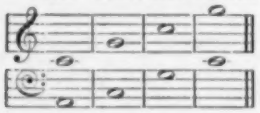
(19) A makes red marks on a ruler which divide it into 13 equal (A parts). B makes black marks, which divide the ruler into 19 equal parts (B parts).
(a) How many A parts are equal to 4 B parts?
(b) Prove that, counting from one end of the ruler, the 3rd and 4th black parts have no red mark between them.
(c) Prove that no A part contains more than two black marks.

(20) Prove that the difference between any two proper fractions is less than 1.

6. *Drawing.*—One or two freehand copies each week to fairly fill a half imperial sheet of paper. Drawings should be sent up for criticism and advice.

7. *Music*—Staff Notation. Transposition of time. Syncopation. Compass of voices.

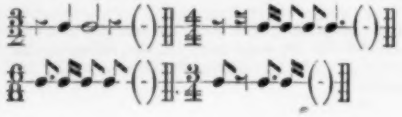
The text-book will give explanations of these. If any difficulty is found, write for assistance. The compass of the voice varies with age, sex, and individual, and also with judicious training. The usual ranges are—



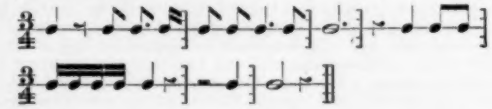
Young children under ten should be able to sing easily C to E¹ (soprano), A, to B (alto); over ten years the range for soprano may be extended to F¹ or G¹.

The following are a few questions on Transposition of Time, etc.:—

(1) Complete each of the following bars by adding one note at the end:—

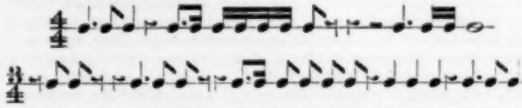


(2) Re-write the following in $\frac{3}{8}$ time, halving the value of every note and rest:—

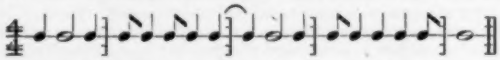


(3) Re-write the following in $\frac{4}{2}$ time, doubling the value of every note and rest:—

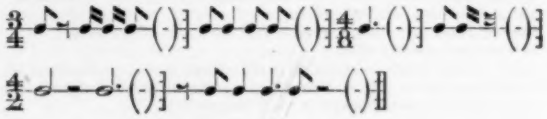
(4) Bar the following notes according to the signature. Each passage commences a bar:—



(5) Place a cross over each syncopated note in the following:—



(6) Complete each of the following bars by adding one note at the end:—



PART II.

1. *English Grammar and Literature.*—Work for the month.
(a) Revise the grammar of the verb.
(b) Abbot and Seeley—Chapter II.
(c) Finish reading *Julius Cæsar*.
(d) Next twenty poems in Palgrave's *Golden Treasury*.
(e) Read *Ivanhoe* and *The Talisman*.

Notes.—(a) The chief points in the grammar of the verb to which attention should be especially given are:—The classification, regular and irregular, transitive and intransitive, moods, tense, voice, gerunds, defective and anomalous verbs, the auxiliaries and their use, and the concords with the subject. The first essential is to learn an exact and complete definition of the term employed. If this is not done there will be endless confusion. To define exactly and comprehensively is not easy, and therefore it is advisable to learn verbatim definitions from a good text-book, rather than to trust to make one up if called up to define. Here is a bad definition. Define voice. "The active voice tells you that the subject does the action." This should be, "Voice is that form of the transitive verb which shows whether the thing denoted by the subject of the sentence is the doer or the recipient of the action expressed by the verb." Haziness of idea and looseness of expression lead to most of the mistakes in grammar. Distinguish carefully between the participle and the gerund; the former combines the function of the verb and adjective, the latter of the verb and noun. Study carefully the subjunctive mood, and notice the difference between it and the conditional indicative. Adopt the following classification for tenses:—

Present	Imperfect—I write.
,,	Perfect—I have written.
,,	Progressive—I am writing.
Past	Imperfect—I wrote.
,,	Perfect—I had written.
,,	Progressive—I was writing.
Future	Imperfect—I shall write.
,,	Perfect—I shall have written.
,,	Progressive—I shall be writing.

(b) The first chapter, which should have received careful attention this month, should be read and reread. Chapter II. deals with the derivation of words. To those who have done their work properly during apprenticeship it will present little difficulty. Those who have not must endeavour to learn all the

prefixes and affixes here set out. Taken in small portions each day, this will not be difficult; but in any case it must be done. Grimm's Law (25, etc.) must be carefully studied, and the changes of meaning in derivation is most important. As pointed out, one can never use words correctly and in their exact sense if the derivation is not known. The study of words soon becomes as interesting as the study of flowers or fossils. Work the various examples given with the aid, if necessary, of a good derivative dictionary, such as Skeat's. The study of these chapters should have a good effect upon your composition. To take one instance. I marked the other day in a history answer, "William was *aggravated* by the resistance of Hereward;" this is a totally wrong use of the word—"annoyed" was what the student meant. To aggravate is to heap up, to make heavier; *e.g.* the discontent of the peasants was aggravated by the imposition of this unjust tax. Another instance quoted by a student was, "To quench the blushes of ingenious shame," a very different thing from ingenuous, which Gray wrote.

(*c*) Finish the reading of *Julius Cæsar*, and endeavour to answer the question, "Why was Shakespeare a great Dramatist?" Apart from his marvellous knowledge, his illimitable store of metaphor and simile, his copious vocabulary, what stands out most clearly is his power of depicting character. With a writer of less ability there is little difference in the characters except in name, and the modern novelist of the second and lower ranks is always endeavouring to bias your judgment by telling you the character of each of his puppets, characters which not unfrequently they do not possess, judged from their words and actions. Shakespeare does not tell you what his characters are supposed to be; they speak and act, and betray their characters in so doing, as every living man does. The more you read of their speeches the better you know them, the clearer can you picture them to yourself. The finest character is that of Brutus, although it was not perfect, as whose is? He is a gentleman in the right sense of the word, a student who turns from the distraction of plotting to his books, a patriot with the highest motives, an ardent lover, a kind and indulgent master to his slaves. He will not take an oath of secrecy—his word is sufficient. He kills his best friend for the good of Rome, and it is no idle boast that he is ready to immolate himself for the same purpose. He has a contempt for ill-gotten wealth, and cannot admit expediency as a reason for wrong action—*noblesse oblige*. And yet his very purity and high-mindedness make him a prey to the man of the world, Cassius. Brutus is theoretical, Cassius is practical; had the advice of the latter been taken, there would have been no flight from Rome, and Brutus might easily have succeeded Cæsar as Dictator. Cæsar summed up the character of Cassius admirably—"He reads much, he is a great observer, and he looks quite through the deeds of men, seldom he smiles," etc. Cassius was not a villain, he was a thorough politician and diplomatist, cool and wary in his actions, resolute and intrepid in his undertakings, and a man of worth, or he would not have had Brutus for his friend. Even in the quarrel scene, though bitterly annoyed and cut to the heart by the words of Brutus, he is still a Roman, and not a maudlin sentimentalist, as he is sometimes depicted on the stage. In all the crises where the judgment of the two men come into conflict, Brutus is in the wrong, that is as far as ultimate advantage counts. Yet Cassius gives in. The cause of the quarrel is a case in point. Cassius, knowing that money was an essential of success, got it—honestly or dishonestly, "at such a time as this it is not right that every nice offence should bear his comment." Brutus, on the one hand, asks money from Cassius to pay his legions, and yet is most indignant because the latter raises it in probably the only way possible. The whole play is of entrancing interest, and will well repay the most careful study.

(*d*) Possibly many students may have read both the novels set for the month. If so, they may read *Richard Yea or Nay*, *Runnymede*, and *Lincoln Fair*.

Ivanhoe, like all Scott's novels, is not to be regarded as historically accurate as to incident, but it gives an excellent picture of the period, the smouldering hatred between the Saxons and Normans, the causes which were slowly but surely making them one people, the state of England during Richard's absence, the conduct of a tournament, the siege of a Norman castle, the work of the Church, the popular hatred of the Jews, the conduct of the Knights Templars which led to their ultimate ruin, Robin Hood and his men, and the knight-errantry of the king. No student can read the book thoughtfully without acquiring a large share of information of quite the right kind. In the historical text-book men are mere names, in the historical novel they are living beings.

The Talisman gives a view of the third crusade, the forces composing it, their leaders and their jealousies, the headstrong conduct of Richard, the mode of fighting between East and West, the difficulties of maintaining an army so far from its base of operations, the chivalry of the period, the wandering minstrels. Unconsciously, perhaps, the author shows how the crusades, though failing in their primary object of conquering Jerusalem, nevertheless opened up trade between East and West, and introduced new terms and ideas into Europe.

Read both books carefully, but do not accept the names and incidents as veritable history (although many of them undoubtedly are); it is the general picture of life and manners which has to be studied.

2. *History.*—(*a*) For this month prepare Henry II., Richard, John, and Henry III.

The text-book will deal with the chief points, but there are a few important phases of the period which require especial mention.

This period is one of changes and contests—the period of the rise of the people and the decay of the Feudal System. The latter was caused by (*a*) the Crusades, which had impoverished many a noble house; (*b*) the rise of the towns. Many of these had bought their liberty from feudal dues by payment of money down, and hence could develop without baronial interference. The burgesses were becoming men of wealth, and were founding industries and extending commerce. (*c*) The anarchy in Stephen's reign had weakened the system, and the Anglican kings pursued the policy of giving the people freedom, as a price of their assistance against turbulent persons.

Henry was a strong ruler, and his reforms were most important. The chief of these were:—

1164—Constitutions of Clarendon.

1166—Assize of Clarendon. Revival of Frank pledge and commencement of the Jury System.

1170—Inquest of Sheriffs. The duty of the Sheriff was to administer justice in the Shire Courts, and the office was generally held by one of the Barons, who not unfrequently was judge in his own case. Henry dismissed nearly all, and appointed in their stead officials from the Exchequer who were directly answerable to him.

1176—Assize of Northampton. England divided into circuits and judges appointed—a system which answered so well that it still obtains.

1181—Assize of Arms. Every freeman to assist the king—revival of the Anglo-Saxon Fyrd.

Henry's quarrel with Becket was another instance of the English kings making a stand against the inordinate demands of the Church. The Conqueror had permitted the establishment of clerical courts, and the Church was gradually extending the jurisdiction of these courts far beyond what was originally intended. Henry demanded what was perfectly just, that clerics should answer to his courts for all offences against the civil law. He carried his point, and although the death of Becket caused the Constitutions to be inoperative for a time, they were not repealed.

Henry came to the throne with the whole nation in a state of anarchy, and left it at peace and in good order.

The reign of John is remarkable for two things—the loss of the French possessions, and the signing of the Magna Carta. The former was a blessing in disguise. As long as the barons held lands in Normandy, they considered themselves as Normans—England was a second consideration—but now there were no oversea ties, they became Englishmen.

The Magna Carta was inevitable. To any people beginning existence under patriarchal and tribal rule, continuing as time went on under a king, there must come a time when the royal prerogative must be clearly stated, and the king must hold office on well-defined conditions. Fortunately for England, the first instalment came early, in France the condition was only secured by a bloody revolution, in Russia it is not yet attained, but is rapidly approaching. John successfully alienated all his subjects—barons, Church, and people, and hence they all combined against him to secure redress of their grievances. Each party claimed and received certain definite rights which must be carefully studied. The only weak point about the Charter was that there were no time clauses, and no definite punishment for infringement of its clauses. No man shall be imprisoned "but by the lawful judgment of his peers or by the law of the land," and yet men *were* imprisoned illegally, and continued to be so till the Habeas Corpus Act was passed.

The First House of Commons.—The misrule of Henry III. resulted in another important change which has had an enormous influence on English history. Let us briefly trace the development of the idea.

The Saxon Witanagemote gave way to the Norman Magnum Concilium, composed of all tenants *in capite*—lay and clerical. Every man who held land from the king had a right to a seat in the King's Council. But the smaller barons, whose estates lay in remote parts of the country, soon ceased to attend, or indeed to be expected to attend. The government, therefore, fell into the hands of the great barons and the mitred clergy. Soon, however, the king had to look to the rich towns for financial aid, and the burgesses were summoned—independently of Parliament—to meet the king. *E.g.* in 1213 John summoned the reeve and four representatives for each parish on the royal estates, and in the same year the sheriffs sent four county representatives to the king. But it was not till the first representative Parliament of Devonport (1265) that all classes were summoned together.

(*a*) The greater barons and clergy—who had always had the right.

(*b*) Two knights from each shire—the descendants of the smaller barons who had allowed their privileges to lapse.

(*c*) Two burgesses from each important town—a distinct innovation.

In the parliaments before this each man had represented himself, now some of the members represented their class. It was not till thirty years later, 1295, that Parliament sat as two houses, and then the knight of the shire sat with the burgesses, although historically they should have been with the lords. From this union of county gentry and rich citizens sprang the great middle class of England which, even to-day, does the major share of the governing. Had a well-defined gulf continued to separate Lords and Commons, as was the case in France, the progress of England would have been much slower. The younger son of the knight married the well-doweried daughter of the citizen, and the wealthy son of the merchant found a wife in the daughter of some needy gentleman, the young lady wisely preferring a little loss of social standing coupled with wealth to the maintenance of a dignity which meant poverty.

(*b*) Read up the reign of George IV., 1820 to 1830. The chief points to be noted are:—

(1) The Cato Street conspiracy—an attempt to start a revolution in England on the same lines as that in France. An utter failure, because those concerned failed to appreciate the great difference in the temperament and the conditions of the two countries.

(2) The Holy Alliance and the Battle of Navarino.

(3) Catholic Emancipation. It must be remembered that in nearly all the laws of toleration passed since the Reformation the Catholics had been excluded. There were till George III.'s reign severe penal laws against them; they were barred from all civil and municipal office, and could not sit in Parliament. It was no wonder that under the leadership of such a man as Daniel O'Connell they should make a protest vigorous enough to force the hands of the Government.

(*c*) *Citizenship.*—Messrs. Ralph Holland and Co. have just published a most useful book on the subject, *British Citizenship—Its Rights and Duties*, and students are recommended to use it. For this month prepare the introduction and Chapter I.

3. *Geography.*—Work for the month:—

(1) The earth in relation to the solar system, the chief characteristics of the sun, moon, and planets.

(2) Limn a map of Germany.

(3) Germany in detail, paying particular attention to productions, imports, exports, industries, chief towns, and government.

(4) Revise the remaining countries of Asia, with the exception of India. For this paper use *Test Questions in Geography* (Meiklejohn and Holden).

Notes.—(1) The student must obtain a clear idea of the solar system, the relative size of the sun and the planets, the distances of the latter from the sun, and the chief peculiarities, *e.g.* the canals of Mars, the bands of Jupiter, the rings of Saturn.

(3) The development of Germany since 1870 has been remarkable, and the cause must be carefully studied. The term Germany is hardly correct, for it implies all the countries where the German language is spoken, and it is better to call it the German Empire. Through the Middle Ages and down to 1815 the various German States (which included Austria) were nominally under an Emperor and Imperial Diet, but really there was no cohesion or common interest. More frequently than not some of the States were fighting others, each had its own army, its own form of government, its own system of customs. Hence Germany was merely a geographical expression. The larger States, Austria, Prussia, Saxony, Bavaria, Hanover, etc., were bitterly jealous of each other, and hence Napoleon found it an easy task to overrun the country and reduce each in turn to servitude. The defeat of the Grand Army in 1812 led the Prussian House against him and the other States to join the movement, and in 1815 all the States were made into a Confederation (Frankfort being the capital), Austria being the chief partner. This Confederation lasted fifty years. Prussia was always jealous of Austria, and after the Prusso-Austria war of 1865–66 a new Confederacy was formed, from which Austria was excluded. In 1870, when the whole of the country was delighted with the success against the French, the present empire was formed, with the King of Prussia as German Emperor. Since then, thanks to the attention paid to education, Germany has become a rival to England in manufactures and commerce.

(4) In revising these countries, draw sketch maps and mark in places to be remembered; the social and industrial condition of the people is of the first importance.

4. *Elementary Science.* — Density of liquids, principle of Archimedes, specific gravity, the U tube, the barometer.

Read these topics up in the text-book; work as many of the experiments as you can.

5. *Elementary Mathematics:*—

(*a*) *Arithmetic.*—Ratio and simple proportion. Read up the theory in Christian and Collar, and work as many of the examples as you can.

(*b*) *Algebra.*—Addition and subtraction.

(*c*) *Geometry.*—Construction of triangles and quadrilaterals from given data.

(*d*) *Euclid.*—Propositions 8, 13–16, with two or three deductions each week.

Test Questions on Last Month's Work.

(1) Write as specimens of copy setting:

(*a*) Large hand.—Autobiographical.

(*b*) Small hand.—Antananarivo is the Capital of Madagascar.

(2) Work the following.

(*a*) Define a prime number. Express 364, 2520, and 5445 as products of powers of prime numbers.

Ans. $2^2 \times 7 \times 13 \times 2^3 \times 3^2 \times 5 \times 7 \times 3^2 \times 5 \times 11$.

(*b*) Find the L.C.M. of $10\frac{1}{2}$, $6\frac{2}{3}$, $4\frac{4}{7}$. Ans. $4042\frac{1}{2}$.

(*c*) What is the least number which leaves 4 when divided by 9, 99, 999, or 9999? Ans. 1,109,843.

(*d*) A, B, and C starting together, skate round a pond one mile in circumference at the rate of 6, 10, and 12 miles an hour respectively. How often will A be passed by B, how often by C, in an hour, and how often and at what intervals of time will the three be exactly abreast?

Ans. B, 3 times; C, 5 times; every 30 minutes.

(*e*) Find in grains the least weight which can be expressed by an exact number of ounces in both Troy and Avoirdupois weight. Ans. 84000.

(3) Explain clearly Residual Object, Cognate Object, Objective Absolute, with examples.

(4) Analyse the following, and parse words in italics:—

'Tis true she bounded by and tripped so light
They had not time *to take* a steady sight;
For truth has *such* a face and such a mien
As to be loved needs only to be seen.

(5) What is a Synonym? Give synonyms for pious, fancy, evident, remorse, loving.

(6) Place each of the following words in a sentence which will show its meaning:—

Induction, categories, empirical, eclectic, æsthetic.

(7) What were the causes of (*a*) Harold's defeat at Hastings; (*b*) Hereward's inability to continue his opposition?

(8) What do you understand by Feudal Incidents?

(9) Give some account of the development of the legal system of England.

(10) How do you account for the social trouble at the end of George III.'s reign?

(11) How does a captain determine his exact position at sea, and why is a day lost in travelling round the world east to west?

(12) Draw a memory map of France and mark in the chief seaports and manufacturing towns, placing against each its chief product.

(13) Estimate the results of the late Russo-Japanese War on the future history of the Far East.

(14) What are the standard measurements in England? Distinguish between fixed and arbitrary units.

All students are invited to write for assistance on any matter connected with this Course. Letters should be sent to Mr. A. T. FLUX, Belvedere, Kent, and must contain the coupon of the current number of the paper, with a stamped addressed envelope if a reply is needed by post.

OUR CERTIFICATE COURSE FOR 1907.

BY GEORGE COLLAR, B.A., B.SC.,

Head-Master of Stockwell Pupil-Teacher School.

IN a few days after the appearance of this number of the *Practical Teacher* our readers who have been following the course will be taking their examination. We heartily wish them success, and trust that the results will be as good as those obtained by those who have followed our courses in past years.

The Certificate Examination in 1907 will not be held till December, which gives those who are preparing for it an advantage of four or five months' extra study. All who are thinking of taking the examination should apply at once to the Secretary, Board of Education, Whitehall, London, S.W., for a copy of the syllabus and regulations, unless they can obtain them from their local education authorities.

Names of candidates must be sent in before 1st September 1907, and although, if a satisfactory reason is shown for the delay, the Board will accept an entry during September on payment of a fine of five shillings, yet none will be received after 30th September under any circumstances.

A candidate must not be less than twenty years of age on the 1st of January 1908, and must have passed the King's Scholarship or other qualifying examination under Schedule I. C. of the Code not later than the 1st of May 1906, must as a rule have been employed for not less than one year as an Uncertificated Teacher in Elementary Schools under Government inspection; and, if he has been a Pupil-teacher, he must have completed his original period of engagement not later than the 31st December 1905.

The only individual subjects which are regarded as "failing subjects" are Reading and Practical Teaching. These subjects will be tested by the Inspector who visits the school, and the report should be obtained from him early in 1907.

The other subjects are treated in the aggregate. They comprise: The Principles of Education, Music, Drawing, Needlework (for women only), English Language, Literature, and Composition, History and Geography, Elementary Mathematics (including Arithmetic), and General Elementary Science (including Nature Knowledge). These are compulsory, and candidates pass or fail on the aggregate of marks obtained in them. Should a candidate pass with distinction in one or more of these subjects, or in an ancient or modern language, he will gain a distinguishing mark on the list.

All the papers set in the Examination will be so framed that candidates with any real knowledge of the subjects can obtain a fair proportion of marks; but each paper will contain harder questions, intended to give advantage to the candidates who deserve to pass with distinction.

Syllabus and Text-books.

There is now no separate paper in either spelling or handwriting, but "defective spelling or handwriting may be taken into account in estimating the value of a candidate's work. Candidates are advised to cultivate a bold, legible hand, and if they are weak, to take daily practice in copy-book writing—the semi-upright style is the one recommended; and while it is not necessary to go in for much ornament, yet the capital letters should receive a certain amount of attention, and great care should be taken with the letters I, J, T, Y, and S, in order that they may not be mistaken one for the other. Should any candidates be weak in spelling, they must pay systematic attention to the matter or they will be penalised in every paper they write.

SECTION A.—*Reading.*—Reading aloud with ease and clear enunciation. Candidates will be expected to read passages from two of the books selected by them from those prescribed for general reading under English Language and Literature, and may be required to read from any other book brought by the Inspector, who may ask questions in order to ascertain whether the selected books have been read intelligently. Reading does not come naturally, and the student must endeavour to acquire the art. He will derive much help from Burrell's *Clear Speaking and Reading* (Longmans), or from Meiklejohn's *Manual of Expressive Reading.*

Practical Teaching.—A lesson to a class in the presence of the Inspector. The lesson may be in any compulsory subject included in the syllabus.

SECTION B.—*The Principles of Education.*—This includes two sections—(i.) The Organisation and Curriculum of Elementary Schools, and (ii.) Methods of Teaching. In both sections general principles are indicated in the syllabus rather than details. The best text-book on this subject is Collar and Crook's *School Management* (Macmillan). As this is the subject with which the teacher should be best acquainted, he should read all the standard books on education that he can obtain; among these we may mention Herbert Spencer's *Education*, Bain's *Education a Science*, Welton's *Logical Bases of Education* (Macmillan), Barnett's *Teaching and Organisation* (Longmans), Quick's *Educational Reformers*, MacCunn's *Making of Character.* He should also master the elements of psychology as set out in Cartwright's *Mental Science* (Nelson), or in a larger book, such as Dexter and Garlick's *Psychology for the School Room* (Longmans).

SECTION C.—*Music.*—This requires both study of the theory and practical work. As our space is so limited we shall be unable to deal with this subject month by month; we cannot help in the practical work, and the student who masters Bertenshaw's *Elements of Music* (Longmans) and Rodger's *Theory of Music* (Curwen) will be well equipped for the examination in theory. These books should be supplemented by Hardy's *How to Train Children's Voices* (Curwen).

SECTION D.—*Drawing.*—This includes (*a*) drawing on the blackboard of (i.) a simple object from memory, (ii.) a group of geometrical models or common objects, (iii.) a piece of ornament or natural foliage; (*b*) model drawing; (*c*) questions on the methods of teaching drawing, with exercises in brush, and scale drawing.

SECTION E.—*Needlework* (for women only).—One of the following exercises will be set:—

(*a*) A test in practical needlework or knitting, based on the work required of children in a Public Elementary School, including the stitches used in the making and repairing of simple garments; or

(*b*) An exercise in cutting out and fixing together the various parts of a garment.

Students should read carefully the articles on needlework now appearing in the *Practical Teacher.*

SECTION F.—*English Language and Composition.*—The principles and practice of English Composition require very systematic study, and the student should take as his text-book either Meiklejohn's *Art of Writing English*, or Nesfield's *Senior Course of English Composition* (Macmillan).

Every student should have a copy of the complete works of Shakespeare, as four of the plays are named for general reading in addition to the *Midsummer Night's Dream*, which is set for detailed study. Messrs. Nelson & Sons have just published a most convenient edition of Shakespeare, on thin paper, in large type, and beautifully bound. The Cambridge Press edition of the *Midsummer Night's Dream* is recommended as the best annotated edition. If the student does not already possess a good edition of Milton's complete works he should obtain the Globe Edition (Macmillan), which contains a very valuable introduction by Professor Masson. The two books of *Paradise Lost* set for special study are published separately with notes by Professor Churton Collins (E. Arnold), and a very carefully annotated edition used to be published by Moffatt & Page, but is now, we believe, published by Arnold, of Leeds. The candidate is required to study an anthology of verse, and the following are suggested as suitable: *The Golden Treasury of Songs and Lyrics* (Palgrave), *The Oxford Book of Verse* (A. T. Q. Couch), *The Paradise of English Poetry* (H. C. Beeching), *English Lyrics from Chaucer to Poe* (W. E. Henley), and the *Flower of the Mind* (A. Meynell). These are all excellent collections, but as the first and fourth profess to deal only with one class of poetry—viz. lyrical—we should feel inclined to advise the student to get one of the others for the sake of variety.

There is a long list of books for general reading, and we advise our readers to go through them all, in spite of the fact that he will be required to bring only "some" of them up to examination pitch. We have already recommended Nelson's edition for the plays of Shakespeare. The particular plays are: *The Merchant of Venice*, *As You Like It*, *Macbeth*, and *Hamlet.* The papers from the *Spectator* are published in the Golden Treasury Series (Macmillan), and as other books will be required in this series, it is an advantage to the student who takes a pride in his little library to have books in the same edition, as the book-shelves look much nicer if the books are uniform. There are many editions of the *Vicar of Wakefield*; the student will highly prize Hugh Thomson's illustrations in

Macmillan's edition. Coleridge's complete works should be obtained in F. Warne's edition; although the two selected poems are issued in paper covers, and are even to be found in some anthologies. Probably our readers have the Century edition of Scott (Nelson); if not, they should obtain that, as it is beautifully printed on India paper, and the three novels, set, viz. *Woodstock*, *Old Mortality*, and *Quentin Durward*, will serve as a starting-point for the acquisition of a complete set of Scott's works as funds permit. The complete poems of Tennyson should be in every teacher's hands, and will not come much more expensive than the separate copies of the works set; although if the student prefers to read the poems with the help of notes, Messrs. Macmillan publish *The Coming and Passing of Arthur*, in one volume, and *Selections*, in another, which includes the poems *Ulysses*, *Tithonus*, *The Lotos Eaters*, and *Oenone*, which are named in the syllabus.

Four of Macaulay's essays are set, viz. those on Milton, Clive, Warren Hastings, and Frederick the Great. The complete essays are published in a half-crown volume by Messrs. Longmans, and the other writings form four similar volumes.

Thackeray's *Newcomes* should be obtained in the Century edition (Nelson), and be made the nest-egg for this novelist's complete works in the same series.

Cheap editions of the *Mill on the Floss* are now appearing. The copyright edition was published by Blackwood. Matthew Arnold's *Selected Poems* are published by Macmillan in the Golden Treasury Series; the *Cloister and the Hearth* (Nelson's Sixpenny Classics), and Stevenson's *Virginibus Puerisque* by Longmans.

Candidates will be called upon to write an essay, but this is provided for in the composition book.

It may seem that the candidate has to incur a great outlay for books in this subject, but we can assure him that he will always look with pleasure on the books he has acquired and read.

SECTION G.—*History and Geography.*—Outline of the History of Great Britain, and detailed study of the History of Great Britain from 1603 to 1688. There are many histories that will serve for the "outlines," such as Green's, Gardiner's, Meiklejohn's, or Ransome's. For the special period the third volume of the *Intermediate History* (University Tutorial Press) is very suitable.

Meiklejohn's, Gill's, or Longmans' Geography should be used. The student should also read such books as Chisholm's *Commercial Geography*, and any other books dealing fully with the subject. Sell's *Commercial Intelligence* is a weekly paper that will keep him up to date and supply some very useful information in geography.

SECTION H.—*Elementary Mathematics (including Arithmetic).*—All candidates must be examined in Arithmetic; and all men must be examined in Algebra and Geometry; women, who wish to pass with distinction in Section H, must be examined in Algebra, Part I., and also either in Euclid, Part I., or in the alternative syllabus for Geometry, Part I. Women cannot be examined in Part II. of these subjects. All our lady readers are advised to take Algebra and Geometry, not only for the sake of the distinction, but also on account of the assistance it will give them in studying and teaching Arithmetic. The *New Arithmetic*, by Christian and Collar, is specially written for those preparing to become teachers, and makes a special point of theory and method. A companion volume on Algebra is now in the press, and will be published in about a month by Meiklejohn & Holden. Some of our readers may prefer to stick to Euclid's text in the subject of geometry, but our advice is to try the modern course, for which numerous text-books are at hand. We should recommend Hall and Stevens', Eggar's, or Christian and Pratt's geometries.

SECTION I.—*General Elementary Science (including Nature Knowledge.*—It is not expected that students will cover the whole of the syllabus, but something should be attempted in each of the two parts. The first part consists of that collection of scientific knowledge generally described as elementary physiography. Cartwright's *Physiography* (Nelson) or Gregory and Simmons' *Physiography* (Macmillan) should be used for the first part. If the student wishes to specialise on the last section, he should get Herbertson's *Physiography*, which will be of very great value also in the study of Geography. Part II. deals with Biology and Nature Study. This is a wide subject, and many books should be consulted. The best plan is to take a separate text-book for each section; Nicholson's *Introductory Text-book of Zoology* (Blackwood) and Murché's *Animal Physiology* (Blackie) deal with the zoological section, and Stage I. *Botany* (University Tutorial Press) deals with the botanical part. Dr. Russell's *Lessons on Plant Life*, now appearing in the *Practical Teacher*, will be found of very great value to Certificate Students.

Notes and Syllabus for July.

PRINCIPLES OF EDUCATION.

Study the first four chapters of the text-book, which deal with school buildings and equipment, the bearing of various types of school building on the work of the school, sanitary conditions and supervision.

The conditions set out in the text-book should be carefully compared with those that hold in the school in which the student is working and in other schools with which he is familiar. The construction and use of different articles of school furniture must be inquired into. The dimensions of the desks, &c., should be obtained by actual measurement, and the relation of seat to desk carefully examined.

ENGLISH LANGUAGE AND COMPOSITION.

Prepare chapters i. and ii. of the *Art of Writing English*, or chapters i., ii., and viii. of Nesfield's *Senior Composition*, and work the exercises.

In addition, prepare essays on the following subjects:—

1. Methods of study.
2. Imagination and Memory.
3. "Shun delays, they breed remorse."

ENGLISH LITERATURE.

Read carefully through the *Midsummer Night's Dream* two or three times, so as to obtain a general idea of the play and of the relation between the different characters. This is in preparation for the detailed study of the play.

If you are not already familiar with Shakespeare's biography, prepare it at once. Every student should get Dowden's *Shakespeare* in Macmillan's Literature Primers. This gives a great deal of information which enables one to study any of the plays fully, and to obtain a great deal of pleasure in so doing.

For general reading read the *Vicar of Wakefield*. This book was hardly appreciated during the lifetime of its author, who received £60 for it. Goethe was the person to claim for the work a high position in literature. He declared it to be not only a well-written and interesting story, but a literary masterpiece, and as such it is regarded by foreign students of English literature even more than by Englishmen themselves. Sir Walter Scott said of it: "We read the *Vicar of Wakefield* in youth and age—we return to it again and again and bless the memory of an author who contrives so well to reconcile us to human nature."

In reading such a book as this, the student should remark the way in which the characters are drawn, the Christian, self-sacrificing spirit of Dr. Primrose, the vanity of his wife, who is ready to sacrifice the true interest of her daughters in order to get into a society that she wrongly considered better than her own, and the simplicity of Moses, which amounts almost to stupidity. In certain respects the novel rests upon manners and customs of Goldsmith's own days, but in many others it depicts types of human beings that will be found among us for all time.

ENGLISH HISTORY.

Prepare the history of Britain up to the Norman Conquest. Note particularly the permanent effects of the Roman Conquest, and the ideas and customs which have come to us from the Romans, as well as the traces of their material works, such as walls and roads. The manners and customs of the Saxons are not generally studied in sufficient fulness; they have had a very great deal of influence in forming those of the modern British nation. The great struggle between Saxon and Dane is generally better known. A full life of the following should be prepared:—Julius Cæsar, Egbert, Alfred, Canute, Godwin, and Dunstan. An outline of the literature should be prepared, and the student should know from what sources we obtain our knowledge of the history of this period.

GEOGRAPHY.

Geography may be described as the study of the arrangement of the earth's surface in its relation to man. It differs from geology, which is concerned with the manner in which the earth's surface, including the parts as deep as we are able to

carry our examination, has been built up. A knowledge of the outlines of geology is essential, and an elementary text-book, or primer, on the subject should be studied. The geological formation of a district generally has much to do with its fitness for human habitation. It decides whether it is flat or mountainous, fertile or barren, and whether there is mineral wealth below the surface or not. And as the same causes which have been working through the geological ages are still operating, a knowledge of those causes is necessary to explain the changes now going on. Another subject closely connected with geography is meteorology. It is necessary to understand the chief factors which determine the climate of a place, as the temperature, rainfall, and prevailing winds have much to do with the fitness of a place for human habitation. Another important matter is to consider the animals and plants which are found there and those which have been or can be introduced, for the presence of useful animals and plants and the absence of injurious ones is very important in deciding whether a place is a suitable dwelling-place for men.

But the geographical conditions not only influence man, but are influenced by him. Thus by clearing forests he may materially alter the climate of a district, or by planting trees, as in the case of the "Landes" in France, he may convert a barren tract into a prosperous region. So he may construct harbours where none exist, or improve inferior ones formed by Nature. By tunnels, bridges, and other means of communication he may throw into relation places that were formerly sundered.

And lastly, as the condition of the earth largely depends on the heavenly bodies, especially the sun, it is essential that the student of geography should know something of astronomy, hence he must take up a section which is often spoken of as "mathematical geography."

This month lay a good foundation for the future work by mastering the introductory sections on mathematical, or astronomical, geography, and such introductory matter; *e.g.* form and motions of the earth, with proofs; latitude and longitude, how determined, and the use of the knowledge; day and night, variation in the length at different times of the year, why the days are always of the same length at the equator; why at other places the day is equal in length to the night only at the vernal and autumnal equinoxes; within what limits the day may be more than twenty-four hours long, and why; why the longest day in Edinburgh is longer than the longest day in London; the seasons; the winds and ocean currents, their causes, and the effect of the earth's motion on their direction.

ARITHMETIC.

This important subject is too frequently neglected by Certificate Candidates, apparently on the assumption that they learnt all about arithmetic before they passed out of the standards. A teacher's knowledge of arithmetic requires to be very thorough; he must not only be able to obtain answers to sums, but must thoroughly understand the theory and principles of the subject. Even the methods of working taught in many schools require radical reform, and although no special methods are indicated as being required, the syllabus states that "in assigning marks, style and method will be considered." The following points are insisted on by some of the most important examining bodies, and presumably the Examiners of the Board of Education will attach weight to them:—

(i.) Subtraction should be worked by the method of complementary addition.

(ii.) Division should be worked by factors if the divisor can be resolved into two factors each less than 13, or higher numbers which are easy to divide by, as 50, 800. In "long" division the Italian method must be used.

(iii.) Decimals should be employed wherever possible in preference to vulgar fractions.

(iv.) Contracted methods should be applied to multiplication and division of decimals, so as to produce approximate results.

(v.) Operations on recurring decimals should be performed on them as such. They should not be converted to vulgar fractions and then reconverted.

The syllabus states also that algebraical symbols and processes will be permitted. It could not say more without making the study of algebra compulsory, but, judging by the questions that have been set of late years, the student with a knowledge of the elements of algebra is at an immense advantage, and we strongly recommend all our readers to take it up.

For this month prepare the first sixteen chapters of the *New Arithmetic*, noticing not only the two processes referred to above, but also the special methods of multiplication and division. Be sure to master the reason for every step taken in the working.

ALGEBRA.

As the text-book will not be ready till next month, the commencement of this subject may be deferred.

GEOMETRY.

Bisection of angles and lines, construction of perpendiculars by various methods and under various conditions, construction of parallel lines, and of triangles and quadrilateral figures.

ELEMENTARY SCIENCE.

Measurements of length, area, and volume. Considerable practice is required to measure even a straight line with accuracy. Such problems as the measurement of the diameter of a sphere require careful consideration. Take a wooden ball and set it between two set squares or between two boxes so as to obtain two points on the table or desk which are vertically under the extremities of the diameter, and measure the distance between these. Measure the diameter of a circular disc, and then measure the circumference by winding a thin piece of paper round it. Divide the circumference by the diameter, and the quotient should be 3·1416, whatever was the size of the disc. Measurements should be taken both in English and metric units, and one used to check the other; *e.g.* take a length in inches and divide it by ·3937; the quotient should agree with the measurement in centimetres.

The balance is of great use in proving the rules for the measurement of areas. Take a piece of thin card and cut an exact square of 4 inch sides, weigh this and divide by 16; this will be the weight of a square inch of the card taken. Cut out a few parallelograms and multiply their length by their breadth. Weigh them each carefully and divide the weight by the weight of one square inch of card; this will give the number of square inches in each case, and should be the same as the product of length and breadth. Similar experiments will show that the area of a triangle is equal to half the product of the base and height. It is also given by the formula $A = \sqrt{s(s-a)(s-b)(s-c)}$, where a, b, and c are the three sides and s is half the sum of the sides. If a circle be very carefully cut out, its area can be shown to be 3·1416 times the square of the radius.

By taking two points on squared paper and drawing a line through them we can obtain a means of rapidly converting English into metric units; *e.g.* take a point, 1 to the right and ·39 above, and another, 10 to the right and 3·9 above, and join them. This line may be used to convert measurements; for example, at 5 to the right it is 1·95 above, hence 5 cm. = 1·95 inch; again, where it is 2·5 above, it is 6·41 to the right, hence 2·5 inches = 6·41 cm.

The Teachers' Register.—The Teachers' Guild, which aims at unity in the teaching profession, has given much earnest thought to the question of the Register. The Council of the Guild has sent the following Resolution to the President of the Board of Education:—

"The Council of the Teachers' Guild, while agreeing with the President of the Board of Education that the present scheme of Registration has not been found workable, and had better be terminated, hope that the Bill will confer powers on the Board of Education to prepare and put in force a revised scheme for the Registration of Teachers."

The Council holds strongly that it is most desirable that a Register of such teachers as at present possess adequate professional qualifications should be formed, on the following grounds, among others:—

(*a*) That such a Register would set a standard towards which non-qualified teachers could work.

(*b*) That, with the promised increase of facilities for training, it would quickly receive large additions.

(*c*) That, if it were to disregard, in its classification of persons registered, the type of school in which a teacher should happen to be engaged and to take note of personal qualifications only, it would do much for the development of professional spirit and the ultimate unification of the teaching profession.

(*d*) That it would give the stamp of professional qualification to many teachers for whom the present Register has no place, as it would admit, if they should satisfy its requirements, the teachers in private or independent schools who give teaching of an elementary character, whether of the kindergarten or of the general preparatory type, many of whom are among the best teachers in the profession.

OUR SCIENCE SECTION

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this number.**

NOTES ON PHYSICS.

BY EDWIN EDSER, A.R.C.SC.

Author of "Heat for Advanced Students," "Light for Students," "Differential and Integral Calculus for Beginners," etc.

Heat.

Given that the mechanical equivalent of unit quantity of heat is equal to 42×10^6 when the fundamental units used are the centimetre, gram, second, and the Centigrade degree of temperature: determine the value of the mechanical equivalent when the fundamental units are the millimetre, milligram, second, and the Fahrenheit degree of temperature.

Joule proved that when heat is generated by the performance of work, the heat produced is directly proportional to the amount of work done, or to the mechanical energy which is dissipated. Hence the ratio

$$\frac{\textit{Energy dissipated}}{\textit{Heat produced}}$$

is a constant; this constant is called the mechanical equivalent, or Joule's equivalent, and is denoted by J.

The value of the mechanical equivalent will vary with the magnitudes of the units of energy and heat; in order to determine the nature of this variation, it is best to express energy as kinetic energy, *i.e.* half the product of the mass, m, of a body into the square of the velocity, v, with which the body is moving. Unit quantity of heat will raise the temperature of unit mass of water through one degree, so that a quantity of heat will be expressed by the product of a mass, M, of water into θ, the number of degrees of temperature through which it is raised. Hence

$$J = \frac{\frac{1}{2}mv^2}{M\theta} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

This equation makes it clear that the value of J is independent of the unit of mass adopted in our fundamental equations; for to convert from one system of units to another, the m in the numerator must be multiplied by the same factor as the M in the denominator.

In the centimetre, gram, second, Centigrade degree system of units J has the value 42×10^6. If we wish to determine the value of J in terms of the millimetre, milligram, second, Fahrenheit degree system of units, we must determine the factor by which (1) must be multiplied when v is changed from centimetres per second to millimetres per second, and θ is changed from Centigrade to Fahrenheit degrees. Now a given velocity, when measured in millimetres per second, will be ten times as great as when measured in centimetres per second; hence v^2 must be multiplied by 100 in order to convert it from cms. per sec. to mm. per sec. A Fahrenheit degree is only $\frac{5}{9}$ of a Centigrade degree; hence a given range of temperature, when expressed in Fahrenheit degrees, will be $\frac{9}{5}$ times as great as when expressed in Centigrade degrees. Thus to convert J from the centimetre, gram, second, Centigrade degree system to the millimetre, milligram, second, Fahrenheit degree system, we must multiply by 100 and divide by $\frac{5}{9}$; hence in the latter system of units

$$J = 42 \times 10^6 \times 100 \times \frac{5}{9} = 23{\cdot}33 \times 10^6.$$

What will be the reading of an accurate mercury thermometer if the bulb is at 300° C. and the stem from 0° upwards at 20° C.? The coefficient of expansion of mercury may be taken as 0·000187, and the linear coefficient of glass 0·000009.

Board of Education (*Heat, Stage II.*), 1905.

Since the thermometer is accurate, the reading would give the temperature of the mercury in the bulb if the stem and the mercury contained in it were at the same temperature as the bulb. Since, however, the stem is colder than the bulb, the mercury in it has contracted; the stem itself has contracted, but to a smaller extent than the contained mercury. Hence the reading will be too low.

Let us take the length of a degree division on the stem, when this is at 0° C., as one unit of length. Let the bore be circular, its radius being equal to r measured in terms of the unit of length adopted. Then at 0° C. the cross sectional area of the stem would be equal to πr^2, and at 300° this area would be equal to $\pi r^2(1+300a)^2$, when a is the coefficient of linear expansion of the glass. At 300° the length of the part of the stem corresponding to 300 degree divisions would be equal to $300(1+300a)$, and thus the volume of the mercury in the stem when this is at 300° C. would be $\pi r^2(1+300a)^2 \times 300(1+300a) = 300\pi r^2(1+300a)^3$.

Let the stem be cooled to 0°, the bulb and its contents being kept at 300° as before; the mercury previously in the stem will remain there, but its volume shrinks to (say) v; then on heating this mercury up to 300° C., its volume would increase to $v(1+300m)$, where m is the coefficient of cubical expansion of the mercury. Hence

$$300\pi r^2(1+300a)^3 = v(1+300m) \quad . \quad . \quad . \quad . \quad . \quad (1)$$

When the stem and its contents are at 20°, the bulb remaining as before at 300°, let the mercury fill l degree divisions of the scale. Then using reasoning exactly similar to that employed in obtaining (1), we obtain

$$l\pi r^2(1+20a)^3 = v(1+20m) \quad . \quad . \quad . \quad . \quad . \quad (2)$$

Dividing (2) by (1) we obtain

$$\frac{l(1+20a)^3}{300(1+300a)^3} = \frac{1+20m}{1+300m}.$$

$$\therefore\ l = 300 \cdot \frac{(1+300a)^3\,(1+20m)}{(1+20a)^3\,(1+300m)}.$$

Since l is measured in terms of a degree division of the thermometer scale, it will give the reading of the thermometer when the stem is at 20° C. Substituting $a = 0{\cdot}000009$, and $m = 0{\cdot}000187$, we have

$$l = 300 \cdot \frac{(1{\cdot}0027)^3 \times 1{\cdot}00374}{(1{\cdot}00018)^3 \times 1{\cdot}0561} \quad . \quad . \quad . \quad . \quad . \quad (3)$$

The final calculation of this result can be facilitated by using the following procedure:—

Let a and b be small in comparison with unity, and let it be required to find the value of

$$\left(\frac{1+a}{1+b}\right)^3.$$

In the first place $(1+a)^3 = 1+3a+3a^2+a^3$, and when a is very small the last two terms may be neglected, as they will be very small in comparison with $3a$. Then the fraction reduces to

$$\frac{1+3a}{1+3b}$$

Now multiply both the numerator and denominator by $1-3b$. We then obtain

$$\frac{(1+3a)(1-3b)}{1-(3b)^2} = \frac{1+3a-3b-9ab}{1-(3b)^2}$$

Here ab will be very small in comparison with $3a-3b$, and $(3b)^2$ will be very small in comparison with 1. Thus the value of the fraction reduces to

$$1+3a-3b$$

Similar reasoning shows that

$$\frac{1+c}{1+d} = 1+c-d,$$

to a sufficiently close approximation.

Using this method in computing the right-hand side of (3), we obtain

$$l = 300\left(\frac{1+0{\cdot}0027}{1+0{\cdot}00018}\right)^3 \cdot \frac{1+0{\cdot}00374}{1+0{\cdot}0561}$$
$$= 300\ \{1+(3\times 0{\cdot}0027)-(3\times 0{\cdot}00018)\}(1+0{\cdot}00374-0{\cdot}0561)$$
$$= 300\ \{1+0{\cdot}00756\}(1-0{\cdot}05237)$$
$$= 300\ (1+0{\cdot}00756-0{\cdot}05237)$$
$$= 300\ (1-0{\cdot}04481) = 300-13{\cdot}4$$
$$= 286{\cdot}6$$

If, when the temperature is 0° C., a mercury thermometer reads +0·5° C., and when at 100° C. it reads 100·8° C., and if the bore of the stem is perfectly cylindrical and the degree divisions of equal length, what is the temperature when the thermometer reads 20° C.?

Board of Education (*Heat, Stage II.*), 1903.

A true rise of temperature of 100° corresponds to a difference in the readings of the thermometer amounting to 100·8 − 0·5 = 100·3. When the thermometer reads 20°, the temperature *measured on the thermometer scale* is 20 − 0·5 = 19·5° above the melting-point of ice, and therefore the true temperature is

$$\frac{19{\cdot}5\times 100}{100{\cdot}3} = \frac{19{\cdot}5\times 1}{1{\cdot}003}$$
$$= 19{\cdot}5\ (1-0{\cdot}003) = 19{\cdot}5-0{\cdot}058$$
$$= 19{\cdot}442$$

Light.

Find the refractive index and the two radii of curvature of the given convex lens by reflection from the back surface and from a plane of glass.

London University, B.Sc. Final (*Practical*), 1904.

The following method can be used in a light room, and results of the greatest accuracy obtained. It will be assumed that the lens is thin, so that the distance from either surface to the second principal focus is equal to the focal length of the lens.

(1) Place the lens on a piece of plane looking-glass laid face upwards on a table. Take a piece of white paper and hold this above the lens, and move it upwards and downwards till the edge of the paper coincides with its real image formed by the light after transmission through the lens, reflection at the plane surface of the mirror, and a second transmission through the lens. In seeking for the image it is well to look downwards from a considerable height (3 or 4 feet). The approximate position of the paper, when it and its image lie in the same plane, having been determined, place an ordinary writing pen, the nib of which has been whitened with chalk, in the position previously occupied by the paper. Adjust the nib so that its point just touches the point of its image; exact coincidence can be ensured by adjusting so that the point of the nib remains coincident with the point of the image when the eye is moved from side to side. Another way of testing is to view the nib and its image with a short focus magnifying glass; when both go in or out of focus at the same instant, the two are coincident. The distance from the point of the nib to the lens is numerically equal to the focal length of the latter.

The theory of this experiment is very simple. When the nib is at the first principal focus of the lens, the rays from it form a virtual erect[1] image at an infinite distance above the lens, after transmission through the latter. This image is reflected in the plane mirror, and gives a virtual erect image at an infinite distance below the mirror. The rays from this last image, after once more passing through the lens, give a real inverted image in the focal plane of the lens; hence the point of the image will just coincide with the point of the object.

(2) Now place the lens in a pool of mercury, so that the lower surface is rendered highly reflecting by the mercury which is in contact with it. Once more adjust the nib, so that its point coincides with the point of the image formed by the rays transmitted downwards through the lens, reflected at the glass-mercury interface, and finally transmitted upwards. Let the distance from the lens to the nib in this position be denoted by d, while r is the radius of curvature of the surface of the lens in contact with the mercury, and f is the focal length of the lens; then

$$\frac{1}{r}-\frac{1}{d}=\frac{1}{f}$$

[1] The nib is, of course, horizontal; the term "erect" is used in the optical sense, *i.e.* to denote that the image points in the same direction as the object. An inverted image is one that points in a direction opposite to that of the object.

The following is the theory of this experiment. The rays from the object are refracted at the upper surface of the lens, and form a virtual image above the latter; if the image is at the centre of curvature of the second surface of the lens, the rays will be reflected back and, after issuing from the lens, will form an image coincident with the object. This will be rendered evident from Fig. 1, which gives the rays proceeding from

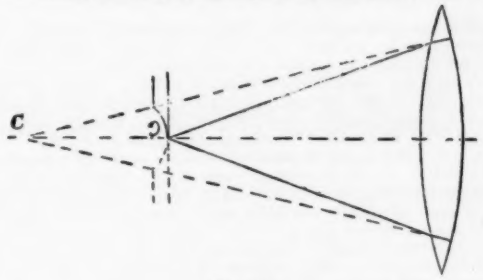


FIG. 1.

the point of the nib O, which is supposed to lie on the axis of the lens. These rays, after refraction at the front surface of the lens, fall normally on the back surface (*i.e.* they appear to proceed from the centre of curvature C of the back surface); consequently the rays are reflected back along the previous course, and form an image at O.

Now when an object is placed at a distance, u, from the curved bounding surface of a medium of refractive index, μ, the distance v from the surface to the image formed is given by the equation—

$$\frac{\mu}{v}-\frac{1}{u}=\frac{\mu-1}{r_1},$$

where r_1 is the radius of curvature of the refracting surface.

In the particular case under consideration, u has the positive value d, while r_1 is the radius of curvature of the upper surface of the lens, and v is equal to the radius of curvature r of the lower surface of the lens; hence

$$\frac{\mu}{r}-\frac{1}{d}=\frac{\mu-1}{r_1}$$
$$\therefore\ \frac{\mu-1+1}{r}-\frac{1}{d}=\frac{\mu-1}{r_1}$$
$$\therefore\ \frac{1}{r}-\frac{1}{d}=(\mu-1)\left(\frac{1}{r_1}-\frac{1}{r}\right)$$
$$=\frac{1}{f},$$

where f is the focal length of the lens determined in the previous experiment.

By turning the lens over and employing the same procedure the radius of curvature of the other surface can be obtained.

Find the refractive index of a liquid being given a piece of looking-glass, a thin convex lens, mercury, and the liquid in question.

Find the focal length f_1 of the lens, and the radius of curvature r of one of its surfaces, by the methods described above. Now place the lens with the surface whose radius of curvature has been found in contact with the looking-glass laid on the table as already described. Run some of the liquid into the space between the lens and the plane surface of the glass; this liquid will be held in position by its surface tension, and will form a plano-concave lens, the radius of curvature of the curved surface being equal to r. Now determine the focal length F of the combination by the method already described; then if f_2 is the focal length of the plano-concave lens, we have

$$\frac{1}{f_1}+\frac{1}{f_2}=\frac{1}{\mathrm{F}}.$$

This determines f_2. Also by the ordinary formula which expresses the relation between the focal length, the refractive index, and the two radii of curvature of a lens, we have

$$\frac{1}{f_2}=(\mu-1)\left(\frac{1}{r}-\frac{1}{\infty}\right)=\frac{\mu-1}{r},$$

where μ is the refractive index of the liquid. Hence finally

$$\mu=1+\frac{r}{f_2}.$$

CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

The Conductivity of Electrolytes.

BEFORE proceeding farther with the theoretical considerations of conductivity we will study the method generally employed for determining the conductivity of an electrolyte.

Usually the conductivity of an electrolyte cannot be determined by the Wheatstone bridge in the ordinary way, because when a current flows through the solution a certain amount of electrolysis takes place. In many cases this causes the liberation or deposition of new substances at the electrodes, and these give rise to an electro-motive force which interferes with the potential fall in the circuit. As an example, suppose we take a solution of dilute sulphuric acid in a cell with platinum electrodes.

As soon as we connect the cell in one arm of the bridge and switch on the current, bubbles of hydrogen collect on the cathode, and bubbles of oxygen collect on the anode. These two fresh substances give an electro-motive force in the opposite direction to that due to the battery, so that the resultant fall in potential in this arm is quite different from what it would have been if the bubbles had not formed.

In a case like copper sulphate solution between copper electrodes, or of silver nitrate between silver electrodes, no difficulty is encountered, as no new substances are formed in the cell.

About 1880 Kohlrausch introduced a method of measurement which has since been very extensively used.

This method can be used for electrolytes and also non-electrolytes, and is at the same time ea y to carry out, and gives accurate results.

It is similar to the ordinary Wheatstone bridge method, except in the following:—

(1) An alternating current is employed instead of the direct one usually made use of.

(2) A telephone receiver is substituted for the galvanometer.

For producing the alternating current a small induction coil without condenser is used. The condenser in an induction coil causes the intermittent current passing between the terminals of the secondary coil to be always in the same direction, but if no condenser is used then the currents pass backwards and

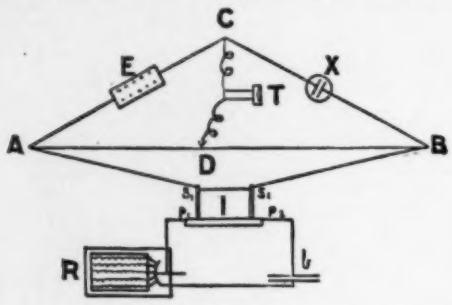


FIG. 1.

forwards alternately. The apparatus is connected up as shown diagrammatically in Fig. 1.

AB is a wire (preferably of platinum) stretched over or alongside a metre scale. AC, CB, AD, and BD are the four arms of the Wheatstone bridge.

E is a resistance-box of known resistances.

X is the cell whose resistance we require to measure.

T is the telephone used in place of the galvanometer.

I is a small induction coil without condenser.

p_1 and p_2 are the two terminals of the primary coil.

p_1 is connected through a rheostat R to one terminal of a battery b, and p_2 is connected directly to the other one. s_1 and s_2 are the terminals of the secondary coil, and these are connected to the two ends of the wire AB.

When the apparatus is connected up, and the measurement is to be made, the handle of the rheostat R is turned from the infinity position until a current sufficiently strong to keep the hammer of the induction coil I vibrating vigorously is obtained. An alternating current is thus generated in the secondary coil, and passes through the Wheatstone bridge, splitting at A (or B). One portion flows along ADB, and the other along AECXB.

The point C is always at a potential intermediate between the potentials of A and B. There will also be some point on ADB, such that its potential is always the same as that of C. If one lead from the telephone is connected to C, and the other lead moved along the wire ADB, this point may be found. When the end of the lead is connected to this point no current passes through the telephone, and consequently it does not sound.

For all other points an alternating current passes through the telephone, and it gives out a note. The pitch is always the same, and depends upon the rate of vibration of the hammer of the induction coil, but the intensity varies with the distance of the point of contact on the wire AB from the point having the same potential as C. By holding the telephone to the ear, and moving the point of contact along AB, it is easy to find approximately the required point.

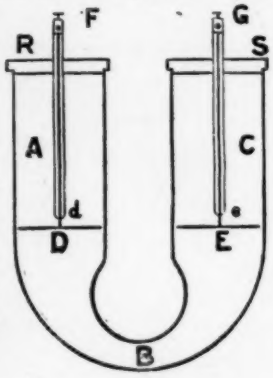


FIG. 2.

To get the point with a great degree of accuracy requires some care, as it is not always easy to say when the sound absolutely ceases. The best results are obtained when the four arms of the bridge are equal, or approximately equal, in resistance; and for this reason we sometimes find that better results can be obtained with the post-office form of Wheatstone bridge than with the metre wire type, as in this type the resistances of the ratio arms of the bridge can be changed to a greater extent than with the metre wire type.

The cells used for determining the resistances of electrolytes vary with the magnitude of the resistance to be measured.

When the conductivity of the solution is good, the type of cell shown in Fig. 2 is generally used. A and C are two glass tubes about 1½ inch in diameter, and about 2½ inches long. These are joined at the bottom by a narrower tube B, as shown. The electrodes consist of two discs of stout platinum, D and E, welded to the ends of stout platinum wires passing through glass tubes to the terminals F and G. The platinum wires are sealed into the glass tubes at the lower ends, d and e. The tubes are supported on ebonite tops, R and S. In order to make the platinum electrodes act to the best advantage, they are coated before use with platinum black.

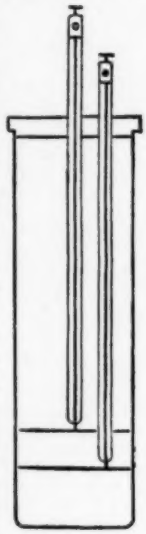


FIG. 3.

The coating is produced by placing in the cell a very dilute solution of platinum chloride, and electrolysing the solution between the two electrodes, reversing the direction of the current from time to time, until both electrodes are coated with a fine black velvety layer of deposited platinum. The electrodes are then thoroughly washed to free them from any trace of platinum chloride.

When the conductivity of the solution is rather poor, a cell, such as that shown in Fig. 3, is used. In this cell the electrodes can be brought fairly close together, so that the thickness of the layer between them is small and the resistance not too great for convenient measurement. In this case one of the electrodes has a hole cut in it to allow the supporting tube of the other one to pass through it, as shown in the figure. The distance between the electrodes can be varied to suit solutions of varied strengths.

Practically all measurements of conductivities of electrolytes are now made by comparison with a few standard solutions of substances whose conductivities have been previously determined with great care. Kohlrausch has, for instance, very carefully examined the conductivity of solutions of potassium chloride in water made up to convenient concentrations by

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using electrodes of carefully ascertained dimensions, and placed at a measured distance apart. He has then calculated the conductivity of a solution of the same strength confined between two electrodes one centimetre apart, and containing the molecular weight of the solute in grams.

Having once standardised a number of easily prepared solutions, it becomes possible to employ comparatively roughly made cells for comparing other solutions with the standard, and thus arriving at their conductivities.

To make the matter as clear as possible, let us take an actual example. Suppose we wish, say, to determine the conductivity of lithium chloride, proceed in the following way:—

Take the electrolytic cell and adjust the position of the electrodes. In the cell place sufficient platinising solution to cover the electrodes.

Instead of dilute platinic chloride alone, the following solution is preferable:—

Water, 30 parts.
Platinic chloride, 1 part.
Lead acetate, ·008 part.

Pass a direct current through the cell, such as to cause a brisk effervescence of gas at the cathode, and a feeble one at the anode. Reverse the direction of the current occasionally, and when the current has passed in each direction for fifteen minutes, the platinisation is complete.

Now very thoroughly wash the cell and soak the electrodes in distilled water to remove all traces of platinic chloride. Dry the cell and the electrodes.

Take the molecular weight of potassium chloride and divide by 10.

This gives us—

$$\frac{35{\cdot}45+39{\cdot}1}{10}, \text{ or } 7{\cdot}455.$$

Take 7·455 grams of potassium chloride, dissolve it in distilled water, and make up to one litre.

Place sufficient of this solution in the cell to well cover the electrodes. Place the cell in a water-bath kept at a constant temperature of 18° C. The water should reach nearly to the top of the cell. It is necessary to keep the temperature constant, as the conductivity varies considerably with the temperature. Now measure the resistance. Let this equal 20 ohms.

The molecular conductivity of a solution is equal to the conductivity of a unit cube of the solution (or the specific conductivity of the solution) multiplied by the volume of the solution containing the molecular weight in grams.

This may be expressed in symbols—

$$u = l\,v \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where u is the molecular conductivity
v is the molecular volume,
l is the specific conductivity.

From Ostwald's tables we have u for $\frac{N}{10}$ potassium chloride solution at 18° C. = 104·7, and v = 10,000 c.c.

$$\therefore \quad l = \frac{104{\cdot}7}{10{,}000} = {\cdot}01047.$$

If r is the resistance of the cell as measured, and L is the conductivity of the cell, then $L = \frac{1}{r}$.

In this case $r = 20$ ohms, and therefore $L = \frac{1}{20} = {\cdot}05$.

The ratio of l to L will be a constant for any given cell, and we will represent this by k. Hence we have—

$$k = \frac{l}{L} \text{ or } l = L\,k \quad . \quad . \quad . \quad (2)$$

Substituting the numerical values for l and L we have—

$$k = \frac{{\cdot}01047}{{\cdot}05} = {\cdot}2094.$$

Now empty the cell, and wash it and the electrodes with distilled water. Prepare a $\frac{N}{10}$ solution of lithium chloride, and introduce sufficient of this into the cell to cover the electrodes. Measure the resistance as before. Take the reciprocal of this, and substitute it for L in the equation—

$$u = k\,L\,v.$$

Knowing k L and v, we get u, the molecular conductivity of a $\frac{N}{10}$ solution of lithium chloride at 18° C.

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

ENERGY—(*continued*).

LAST month we considered the case of the conversion of kinetic energy into potential energy and *vice versâ*. In this case there is no great difficulty in recognising the principle of conservation of energy, but in very many cases energy of visible motion is converted into energy of molecular motion, and sometimes the energy seems to have been destroyed. For instance, when a train is in rapid motion on a level railway track it possesses a great amount of kinetic energy. When the brakes are applied the train gradually comes to rest, but although the kinetic energy disappears it is not converted into potential energy. What then becomes of it? Is it destroyed or converted into some other form of energy? Questions of this nature for ages were left without any answer, and it is only within the last century or so that the matter has been gradually cleared up. The great stumbling-block in the way of progress was the fact that heat was regarded as a material substance. In many cases the production of heat by hammering and friction could not be satisfactorily explained. One view advocated was that during percussion or friction, heat was drawn from the surrounding bodies, but how or why could not be explained. Another view held by many was that the capacity for heat of each of the two bodies rubbed together was diminished and heat was squeezed out of them. A little over a hundred years ago, however, Davy proved experimentally, that this view was absolutely incorrect. He showed that by rubbing together two pieces of ice they could both be gradually melted. The resultant water, however, had a greater capacity for heat than the ice. The view, then, that the capacity of a body for heat was diminished by friction became untenable. Other experiments conducted by Davy also showed that heat was not drawn from the surrounding bodies. Davy therefore disproved the older ideas and came to the conclusion that heat was not a material at all but consisted of a motion of the corpuscles (or molecules) of bodies.

About the same time that Davy was working on this subject in England, Count Rumford was investigating the subject. He was engaged on the boring of cannon in the arsenal at Munich, and he noticed the great amount of heat produced during the boring operations. As the store of heat produced in this way seemed to be inexhaustible he came to the conclusion that the heat must be due to motion. He also made a rough determination of the amount of heat produced by a measured quantity of mechanical energy. He also suggested that the generation of heat by the churning up of liquids might give a reliable method of determining the mechanical equivalent of heat. This suggestion was acted on at a later date by Dr. Joule.

Thus arose the dynamical theory of heat which regards heat as a mode of motion.

The conversion of heat into mechanical energy was first thoroughly studied by a young French philosopher named Carnot. He very ingeniously compared the power of heat with that of water, and showed that just as water must flow from one position to a lower position in order to do work, so heat must pass from a body at a higher temperature to one at a lower temperature, in order that it may produce any mechanical effect. Carnot, however, still held to the old idea that heat was a substance; and after his death, which unfortunately occurred at an early age, his principle was modified by Thompson, Rankine, and Clausius to conform to the requirements of the dynamical theory of heat.

The following list, although not exhaustive, will form a useful summary of the more generally recognised forms of energy:—

I. Molar kinetic energy, or the energy of a body in visible motion.

II. Molar potential energy, or the potential energy which a body possesses in virtue of its position with regard to the earth, the tension of a spring, &c., on any other force acting through a considerable distance.

III. Energy of radiation. We regard radiant heat and light as consisting of the vibration of the ether. Perhaps it would be more correct to speak of this as radiant energy, which is capable of giving rise to heat, &c. This form of radiation is capable of passing through interplanetary space with very little loss.

IV. Kinetic energy of heat. When a body is heated, in all probability the heat is largely converted into a mode of motion of the molecules of the body.

V. Molecular potential energy. When a body is heated, in

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general it expands, and a certain amount of work is done in moving the molecules farther apart. This produces potential energy, the force of molecular attraction tending to bring the molecules together again.

VI. The energy of current electricity. If we pass a current of electricity through a cable to a motor we may by means of the motor do a considerable amount of work. The energy which passes through the cable, we know, is much greater than that which corresponds to the heat produced in the cable. This energy we may call the energy of electricity in motion.

VII. The potential energy of electrical charges. If we have two bodies charged to different electrical potentials, there is a tendency for electricity to flow from the one at the higher potential to the one at the lower potential, causing what is equivalent to a force of attraction between the two bodies.

VIII. Potential energy due to chemical affinity. Certain chemical elements possess strong chemical affinities for others; for instance, suppose we wish to separate water into its elements hydrogen and oxygen, we must supply in some form a considerable amount of energy. If we cause them to recombine by mixing them in proper proportions, and applying a flame to them, the energy is again given out in the form of heat. Hence we may regard energy used in the separation as having been converted into a form of potential energy.

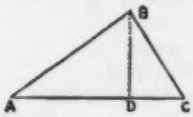
MATHEMATICS.

(STAGES 2 AND 3.)

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mathematics, etc., Morley College; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Area of a Triangle.—The area of a triangle ABC is the product of one-half the base AC and the perpendicular BD.



As $AC = b$ and $BD = c \sin A$

$\therefore$ area $= \frac{1}{2} bc \sin A$ . . . (i.)

This may be expressed in terms of the sides as follows:—

$$\sin A = 2 \sin \frac{A}{2} \cos \frac{A}{2}$$

$$= 2 \sqrt{\frac{(s-b)(s-c)}{bc}} \times \sqrt{\frac{s(s-a)}{bc}}$$

$$\therefore \text{area} = \frac{bc}{2} \times \frac{2}{bc} \sqrt{s(s-a)(s-b)(s-c)} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{(ii.)}$$

The area may be obtained from (i.) when two sides and included angle are given, and from (ii.) when the three sides are given.

Ex. 1. State what are the values of $\sin \frac{A}{2}$ and $\cos \frac{A}{2}$ in terms of the sides of the triangle ABC, and deduce the expression for the area of the triangle in terms of the sides.

If the sides of the triangle are 544·36, 426·39, and 425·09, find the area. (1902)

$a = 544{\cdot}36$	$s = 697{\cdot}92$
$b = 426{\cdot}39$	$s - a = 153{\cdot}56$
$c = 425{\cdot}09$	$s - b = 271{\cdot}53$
$2s = 1395{\cdot}84$	$s - c = 272{\cdot}83$

$$\therefore \text{area} = \sqrt{697{\cdot}92 \times 153{\cdot}56 \times 271{\cdot}53 \times 272{\cdot}83}$$

$$= 89103{\cdot}92$$

Ex. 2. In the triangle ABC, lines AD, BE are drawn at right angles to BC and CA respectively; show that the area of the triangle ABC is equal to

$$\frac{AD \times BE}{2 \sin C}$$

Calculate the area, when AD = 486·5 feet, BE = 294·3 feet, and $C = 55° 40'$. (1901)

$$\log (\text{area}) = \log 486{\cdot}5 + \log 294{\cdot}3 - \log 2 - \log \sin 55° 40'.$$

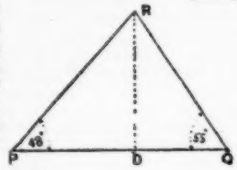
$\log 486{\cdot}5 = 2{\cdot}6870828$	$\log 2 = 0{\cdot}3010300$
$\quad 294{\cdot}3 = 2{\cdot}4687903$	$\log \sin 55° 40' = \bar{1}{\cdot}9168593$
$5{\cdot}1558731$	$\bar{1}{\cdot}2178893$
$\bar{1}{\cdot}2178893$	
$\log (\text{area}) = 4{\cdot}9379838$	

$\therefore$ area = 86693 square feet.

Heights and Distances.—The applications of the solutions of triangles to problems involving the height of a given object or the length of a base line are usually known as "heights and distances." A few typical problems from recent examination papers will serve to show the methods which may be adopted in some cases. Simpler problems are readily obtainable from any text-book on Trigonometry.

Ex. 3. P and Q are two stations 1000 yards apart on a straight stretch of sea-shore which bears east and west. At P a rock bears 42° west of south, at Q it bears 35° east of south. Show that the distance of the rock from the shore is 1000 sin 48° sin 55° ÷ sin 77° yards, and calculate this distance to the nearest yard. (1903)

Let P and Q denote the two stations and R the position of the rock, then in the triangle PRQ the angles QPR and PQR are 48° and 55° respectively, and therefore the angle PRQ = 77°. Draw RD perpendicular to PQ. This represents the distance of the rock from the shore.



$$RD = PR \sin 48°$$

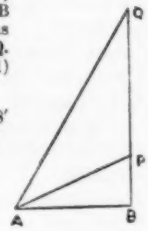
$$\text{also } \frac{PR}{\sin 55°} = \frac{PQ}{\sin 77°} = \frac{1000}{\sin 77°}$$

$$\therefore PR = \frac{1000 \sin 55°}{\sin 77°}$$

$$RD = \frac{1000 \sin 48° \sin 55°}{\sin 77°}$$

Substituting values for sin 48°, etc., the distance RD = 625 yards.

Ex. 4. AB is a horizontal line 120 feet long; BPQ is a vertical line; P is such that PAB equals 23° 18′; and QB is five times as long as PB; find the angle PAQ and the length of AQ. (1901)



$$BP = 120 \tan 23° 18'$$

$$\text{and } BQ = 5\,PB = 600 \tan 23° 18'$$

$$\tan QAB = \frac{QB}{BA} = \frac{600 \tan 23° 18'}{120}$$

$$= 5 \tan 23° 18'$$

$$\therefore QAB = 65° 5' 24''$$

$$\text{also } PAB = 23° 18'$$

$$\therefore PAQ = 41° 47' 24''$$

$$\text{angle } AQB = 90° - 65° 5' 24 = 24° 54' 36''$$

$$\therefore AB = AQ \sin 24° 54' 36''$$

$$\text{or } AQ = \frac{120}{\sin 24° 54' 36''}$$

$$\log AQ = \log 120 - \log (\sin 24° 54' 36'')$$

$$\therefore AQ = 284{\cdot}904 \text{ feet.}$$

Ex. 5. Find an expression for the area of a triangle in terms of two sides and the included angle.

The area of a triangle is 1872 square feet; the sides b and c are 104 feet and 84 feet; calculate the angle A.

Explain why more than one triangle can be determined from the data. (1898)

Ex. 6. From the top of a vertical cliff 100 feet high, forming one bank of a river, the angles of depression of the top and bottom of a vertical cliff, which forms the opposite bank of the river, are 28° 40′ and 64° 30′ respectively. Find the height of the cliff on the opposite bank and the width of the river. (1898)

Ans. 73·9 feet; 47·697 feet.

Ex. 7. A horizontal line is 1000 yards long, and runs from east to west; from the eastern end, the summit of a hill bears 3° 25′ east of north, and is at an altitude of 41° 48′; from the other end, it bears 45° 25′ east of north. Find, to the nearest foot, the vertical height of the summit above the points of observation. Ans. 2814 feet. (1902)

Ex. 8. The angular elevation of the top of a spire is 60°, and the angular elevation of the top of the tower on which the spire stands is 30°; the height of the tower is 50 feet; calculate the height of the spire, and verify your result by using a scale and a protractor. Ans. 100 feet. (1905)

Ex. 9. Find an expression for the area of a triangle (i.) when two sides and the included angle are given; (ii.) when one side and the angles are given. (1905)

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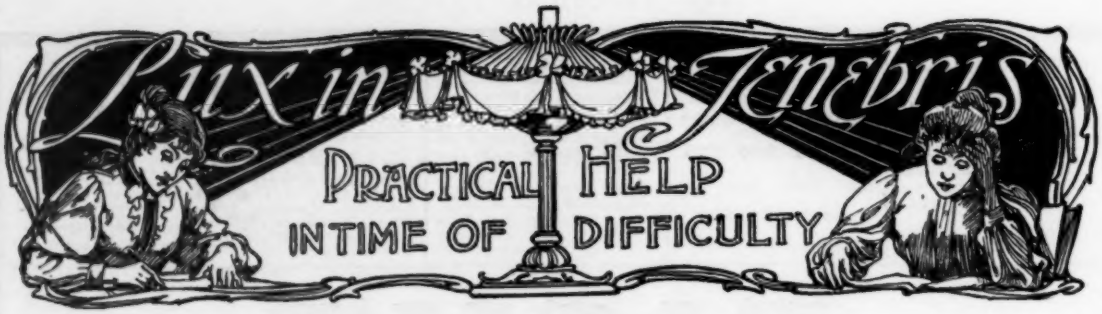

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C. W.—If from any point P normals are drawn to the curve

$$y^m = ax^n,$$

show that the feet of the normals lie on a conic of which the straight line joining P to the origin is a diameter.

Find the position of the axes of this conic.

(Edwards' *Differential Calculus for Beginners.*)

Let (x', y') be the co-ordinates of the point P. Then from Edwards, § 99, we have for the curve on which lie the feet of the normals which can be drawn to the given curve so as to pass through the point (x', y')

$$(x'-x)f_y-(y'-y)f_x=0 \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

For the given curve,

$$f_y = my^{m-1} \text{ and } f_x = mnax^{n-1}.$$

Thus equation (1) becomes

$$(x'-x)my^{m-1}-(y'-y)mnax^{n-1}=0,$$
$$\text{or } (x'-x)y^m-(y'-y)nax^{n-1}y=0,$$
$$\text{or } (x'-x)ax^n=(y'-y)nax^{n-1}y=0,$$
$$\text{or } n(x'-x)x-n(y'-y)y=0.$$

Hence equation (1) reduces to

$$nx^2-ny^2-nx'x+ny'y=0 \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

This is the equation of a conic passing through the origin and also through the point (x', y').

The centre of the conic represented by equation (2) has for its co-ordinates $\left(\frac{nx'}{2n}, \frac{ny'}{2n}\right)$; that is, the point $\left(\frac{x'}{2}, \frac{y'}{2}\right)$ is the centre of the conic (2).

Now the straight line joining P to the origin has for its equation

$$xy'-x'y=0.$$

Hence this line passes through the centre $\left(\frac{x'}{2}, \frac{y'}{2}\right)$. But we have shown that the extremities of this line lie on the conic (2); therefore this line is a diameter of the conic (2).

The axes of a conic bisect the angles between the asymptotes, and the asymptotes are parallel to the lines represented by the equation formed by equating to zero the terms of the second degree in the equation of the conic. The asymptotes of the conic (2) are therefore parallel to the lines given by the equation

$$nx^2-ny^2=0.$$

Now it is evident that the angles between these lines are bisected by the original axes. Hence the axes of the conic (2) are the lines drawn through the centre $\left(\frac{x'}{2}, \frac{y'}{2}\right)$ parallel to the original axes.

Rex.—The attraction of a planet on its satellites varies directly as the mass (M) of the planet and inversely as the square of the distance (D); also the square of the satellite's time of revolution varies directly as the distance and inversely as the force of attraction. If m_1, d_1, t_1, and m_2, d_2, t_2, are simultaneous values of M, D, T, respectively, prove that

$$\frac{m_1t_1^2}{m_2t_2^2}=\frac{d_1^3}{d_2^3}.$$

Hence find the time of revolution of that moon of Jupiter whose distance is to the distance of our moon as 35 : 31, having given that the mass of Jupiter is 343 times that of the earth and that the moon's period is 27·32 days.

(Hall and Knight's *Higher Algebra.*)

T denotes the time of revolution of a satellite about its planet; let F denote the attractive force.

Then by the question we have

$$F \propto \frac{M}{D^2}; \text{ and } T^2 \propto \frac{D}{F}.$$

$$\text{Hence } F = a\frac{M}{D^2} \text{ and } T^2 = b\frac{D}{F},$$

where a and b are constants.

We have therefore $D=\frac{1}{b}FT^2$.

$$\text{But } F=a\frac{M}{D^2}; \text{ therefore } D=\frac{a}{b}\frac{M}{D^2}T^2.$$

$$\text{Hence } MT^2=\frac{b}{a}D^3; \text{ that is}$$

$$MT^2=kD^3, \text{ where } k=\frac{b}{a}, \text{ a constant.}$$

Thus $m_1t_1^2=kd_1^3$; $m_2t_2^2=kd_2^3$.

$$\text{Hence } \frac{m_1t_1^2}{m_2t_2^2}=\frac{d_1^3}{d_2^3} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

If m_1 be the mass of Jupiter and m_2 that of the earth, we have, by the data of the question, $\frac{m_1}{m_2}=\frac{343}{1}$; also if t_1 be the time of revolution of the moon of Jupiter about the planet, and t_2 the moon's period, we have $\frac{t_1}{t_2}=\frac{t_1}{27\cdot32}$; finally, if d_1 be the distance of Jupiter's moon from the planet, and d_2 the distance of the moon from the earth, we have by the question $\frac{d_1}{d_2}=\frac{35}{31}$. Substituting these values in (1) we have

$$\frac{343t_1^2}{1(27\cdot32)^2}=\frac{(35)^3}{(31)^3}.$$

$$\text{Hence } t_1^2=\frac{35\times35\times35}{31\times31\times31}\times\frac{27\cdot32\times27\cdot32}{343}.$$

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Maths.—(*a*) In the triangle ABC draw AD to meet BC at right angles in D, BE to meet AC at right angles in E, CF to meet AB at right angles in F; find the angles of the triangle DEF in terms of the angles of the triangle ABC, and show that the perimeter of the triangle DEF is

$$a \cos A + b \cos B + c \cos C.$$

(*b*) If one side BC of a triangle be given, and the lengths of the perpendiculars BE, CF upon the other two sides, show by means of a diagram that there are in general two different triangles, ABC and A'BC, which satisfy these conditions.

(*Pure Mathematics*, Stage 2.)

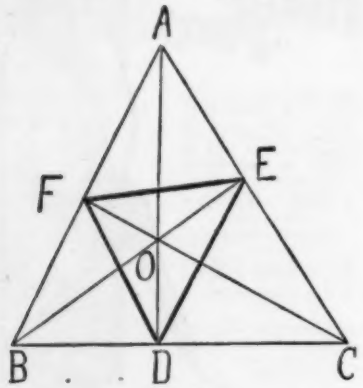

FIG. 1.

Let O be the point of intersection of the perpendiculars BE, CF. Then by a well-known theorem the perpendicular AD passes through O. Because ADC, CFA are right angles, a circle goes about ACDF. Here the angle ADF is equal to the angle ACF. Similarly a circle goes about ABDE; therefore the angle ADE is equal to the angle ABE. Also a circle goes about BCEF; therefore the angle ABE is equal to the angle ACF. Hence the angle FDE is equal to twice the angle ABE; and the angle ABE = (90° − A); therefore

$$FDE = 2(90° - A) = 180° - 2A.$$

Similarly DEF = 180° − 2B, and EFD = 180° − 2C. Because in the quadrilateral AEOF the angles at E, F are right angles,

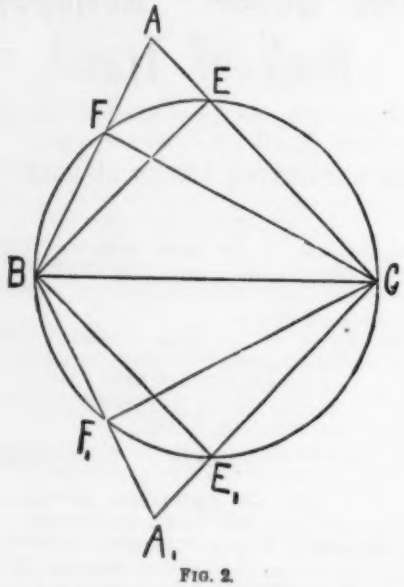

FIG. 2.

therefore A, E, O, and F lie on a circle of which AO is a diameter. Now AFE is a triangle inscribed in this circle, and in any triangle inscribed in a circle any side is equal to the product of the sine of the opposite angle and the diameter of the circle; therefore FE = AO sin A.

But AO = AE cosec AOE = AE cos C.

Therefore FE = AE cosec C sin A.

But AE = AB cos A = c cos A.

Therefore $FE = c \cos A \frac{\sin A}{\sin C} = c \cos A \frac{a}{c}$.

Hence FE = a cos A.

Similarly FD = b cos B

and DE = c cos C.

Therefore the perimeter of the triangle DEF is

$$a \cos A + b \cos B + c \cos C.$$

(*c*) The required diagram is shown in Fig. 2.

Bike.—Find the locus of a point such that the angles between the connectors of the vertex of the parabola, $y^2 = 4ax$, with the points of contact of the tangents from the point, may have a given pair of bisectors.

The chord of contact of tangents from any point (x', y') to the parabola

$$y^2 = 4ax \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

is given by the equation

$$yy' = 2a(x + x') \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

The intersection of this line with the parabola gives the points of contact which we may denote by (x_1, y_1) and (x_2, y_2). Combining (1) and (2) we find

$$x_1 = \frac{(y'^2 - 2ax') + y'\sqrt{y'^2 - 4ax'}}{2a} \quad . \quad . \quad . \quad . \quad (3)$$

$$x_2 = \frac{(y'^2 - 2ax') - y'\sqrt{y'^2 - 4ax'}}{2a} \quad . \quad . \quad . \quad . \quad (4)$$

$$y_1 = y' + \sqrt{y'^2 - 4ax'} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

$$y_2 = y' - \sqrt{y'^2 - 4ax'} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

Now the lines joining the vertex of the parabola to the points of contact are $xy_1 - yx_1 = 0$ and $xy_2 - yx_2 = 0$. Hence the equation representing this pair of straight lines is

$$(xy_1 - yx_1)(xy_2 - yx_2) = 0,$$

and this may be written in the form

$$y_1y_2x^2 - (y_1x_2 + y_2x_1)xy + x_1x_2y^2 = 0 \quad . \quad . \quad . \quad (7)$$

Now the bisectors of the angles between the lines represented by the equation $Ax^2 + Bxy + Cy^2 = 0$ are given by the equation $x^2 - 2\frac{A - C}{B}xy - y^2 = 0$; hence the bisectors of the angles between the pair of straight lines represented by equation (7) are given by

$$x^2 - 2\frac{2x_1x_2 - y_1y_2}{y_1x_2 + y_2x_1}xy - y^2 = 0 \quad . \quad . \quad . \quad . \quad . \quad . \quad (8)$$

But from (3), (4), (5), and (6) we have

$$y_1y_2 = 4ax', \; x_1x_2 = x'^2, \; y_1x_2 + y_2x_1 = 2x'y'.$$

Thus (8) may be written

$$x^2 - 2\frac{x'^2 - 4ax'}{2x'y'}xy - y^2 = 0,$$

and this reduces to

$$x^2 - \frac{x' - 4a}{y'}xy - y^2 = 0.$$

Now it is obvious that the equation of the given pair of bisectors must be of the form

$$x^2 - 2pxy - y^2 = 0,$$

where p is a given constant.

Hence $\frac{x' - 4a}{y'} = 2p$.

Removing the accents, we have for the required locus the straight line

$$x - 4a = 2py.$$

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GEORGE ALLEN, LONDON.

Science in Public Affairs. With Preface by the Right Hon. R. B. Haldane, K.C., M.P., LL.D. Edited by the Rev. J. E. Hand, Editor of *Ideals of Science and Faith*, etc. "Science in Public Affairs" seems almost equivalent in vagueness to "A Treatise upon Things in General" as a book title. The mention of the subject suggests two possible lines of discussion. If one were to discuss the science which is actually exhibited in the treatment of our public affairs, the book might almost rival in brevity the traditional essay on the snakes of Iceland. If, however, the line of discussion were to be the sciences which ought to guide public affairs, the first difficulty would be to find a writer competent to deal with so encyclopædic a range of scientific material, and the second to compress its treatment into one volume. The editor of this book has circumvented the first difficulty by calling into service a number of writers, each dealing with a special department of public affairs, while the second difficulty has been outflanked by selecting only a few departments for discussion.

The book is composed of seven separate essays. Physical Development is treated by C. H. Denyer, M.A., and the Editor, who find most of their material in the reports of recent committees. The housing question (City Suburbs) is discussed by Mrs. S. A. Barnett, who devotes much space to an account of the Hampstead Garden Suburb and the aim of the Garden Suburb Trust. On National Education a valuable essay is presented by Professor Michael E. Sadler, which will be read with interest and profit by all teachers. We quote his closing paragraph: "To sum up, for the welfare of English education, are not these things the most necessary—to secure, at all costs, good teachers and plenty of them, both in secondary and elementary schools; to give free scope to individual conviction; to pay more attention to physical training and to the physical well-being of the children, especially in the elementary schools; to cultivate the power of expression in the mother tongue and the love of good literature; to spare no effort in training the power of imagination, combined with the habit of exact thinking; to make the study of nature part of the work of every school; to encourage and record experiments in methods of teaching; not to sacrifice spontaneity of mind to the claims of examinations; and to foster in schools of all grades, public and private, the national spirit?"—To which we cordially agree, and incidentally note how little relation our numerous education acts and bills have to all this.

Colonial Development is discussed by H. de R. Walker, M.P., who summarises the various movements made by the Home government and the Colonial governments for developing Colonial industry and trade, with valuable criticisms and suggestions. An excellent paper on Science and Industry is contributed by J. A. Hobson, M.A., in which he deals with such topics as the mechanisation and standardisation which science has introduced into industrial processes, the influence of capitalism, the conflicts between capital and labour, and the improvements of business method. Administration, and the science which ought to, but does not, form its basis, is the subject of a short contribution by Charles M. Douglas, M.A., D.Sc. Victor V. Branford, M.A., Honorary Secretary of the Sociological Society, deals with Citizenship in a somewhat discursive article, of which the first two-thirds at least seems to be introductory and only partially relevant, but whose concluding portions make full amends. One notes in passing that he quotes as a "well-established maxim," "If a lion gets in your path, kick it," and one cannot repress a feeling of mild curiosity as to the scientific basis of the maxim.

Mention should be made of the brief but sympathetic preface by the Right Hon. R. B. Haldane, which in a few paragraphs states admirably the need for the science in public affairs which is the theme of the volume. "Our best reformers," he says, "in such subjects as Poor Law Administration, in Education, in Local Government, in the region which belongs to the Labour and Commercial sides of the Board of Trade, in Public Health, and, last but not least, in Railway Administration, are yearly insisting more loudly on the necessity of the trained mind." It was doubtless the modesty of the writer which prevented his adding a department which the reviewer is not similarly restrained from mentioning, namely, the affairs which pertain to the War Office. We look to Mr. Haldane to supply not only a preface to such a book, but a notable practical example of Science in Public Affairs.

The great danger in such a book as the present is that of hypostatising and then deifying science, forgetting that it simply means knowledge. There is much more than knowledge needed in order to bring about the social millenium, or even the individual reforms advocated by the various writers. On the whole the contributions do not err excessively in the line of this modern superstition, and the tone throughout is sane and moderate. We need books of this type to awaken us from what it seems undue flattery to call, as Mr. Haldane calls it, our "dogmatic slumber,"—a state more accurately described, perhaps, by Dr. Johnson's phrase, "pure ignorance."

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